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Disk Wiper™ 15 Professional

User Manual

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Introduction

Data security nowadays is the burning issue not only for companies and government agencies, but rank and file people as well. Our personality is now fully embedded in computer technology. It is computer you apply to when at work, it is also computer you use at home for entertainment or as a reservoir for containing some valuable data such as personal correspondence, banking account information, credit card numbers, financial records, whatever… It is obvious that this kind of data should in no way be available to others. That is why, when disposing of a storage device (a hard disk or a flash memory drive), the crucial thing is to make sure it does not contain any information, because simple deletion, or even reformatting do not guarantee data security at all. To do that, you need a specially designed tool.

Paragon Disk Wiper™ 15 Professional is a fast, convenient and reliable solution providing irreversible destruction of data on separate partitions or entire hard disks (IDE, SCSI, SATA, USB, etc.) as well as any type of flash memory devices.

In this manual you will find the answers to many of the technical questions, which might arise while using the program.

Our company is constantly releasing new versions and updates to its software, that's why images shown in this manual may be different from what you see on your screen.

What's New in Disk Wiper 15

- **Wiping SSD** (Solid State Drive). As you know SSD stores data differently from hard disks, thus existing disk sanitization techniques originally used for HDDs don't work on SSDs because the internal architecture of an SSD is very different from that of a hard disk. Reliable SSD sanitization requires built-in, verifiable sanitize operations. After some research on the issue, our company has improved our disk wiping technology and can now guarantee irreversible secure data destruction on SSD storage devices.
- **Wipe stamp option**. You can specify to add to the MBR (Master Boot Record) of the wiped storage device information on the used wipe program, algorithm, device serial number, wipe status, system ID (obtained through WMI), etc. Thus when attempting to boot from this storage, you'll be notified how and when this storage has been wiped. Please note this option is only available for wiping of entire disks.
- **BitLocker support.** Our product allows wiping unlocked volumes encrypted by BitLocker.
- **Wiping Mac OS volumes.** With the Linux based recovery environment, you can start up a Mac computer to irreversible destroy data it contains.
- **Embedded Recovery Media Builder (RMB) 3.0**. Instead of two utilities downloaded from Paragon's website (BMB and RMB), the new RMB 3.0 is now embedded into the product. Combining the best of the two utilities, it can boast more options, usability, and stability:
  - Prepares Linux or WinPE-based bootable environment on a USB thumb drive or in an ISO image;
  - Doesn't obligatory require Windows Assessment and Deployment Kit (ADK) or Automated Installation Kit (WAIK) on Windows 7 and later platforms;
  - Can build WinPE-based media on Windows XP, Vista, Server 2003 if there's WAIK installed in the system;
  - Allows injecting additional drivers for storage devices, network controllers, USB controllers, or system during setup;
  - Enables to set up a network connection with a pre-mounted network share during setup;
  - Prepares hybrid (both, uEFI and BIOS compatible) 64-bit recovery environment on flash or in an ISO image.

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- **Windows 8.1** support
- New user-friendly interface that is fully compatible with the Windows 8 streamlined, tile-oriented interface:
  - Metro-style Express Launcher;
  - Ribbon-based full scale launcher.

  GUI of the Linux recovery environment has also been uplifted.

Product Components

In order to cope with different tasks, the product contains several components:

- Windows based set of utilities is the crucial part of the product. With the help of an easy to use launcher you may find and run tasks of any complexity in the field of data and system protection, hard disk partitioning and cloning, etc.
- Linux/DOS based recovery environment is a multi-platform bootable media that enables to run utilities under Linux or PTS DOS, and that way to get access to your hard disk for maintenance or recovery purposes. Both platforms have their strong sides, for instance Linux can boast support of FireWire (i.e. IEEE1394) or USB devices. It enables to burn CD/DVD discs. However there can be some difficulties with detecting new hardware. DOS in its turn has no problems of that kind but is limited in features. The Linux/DOS recovery environment requires no installation and can be of great help when the system fails to boot. Besides it offers a Windows XP like environment.
- WinPE based recovery environment. Especially for keen followers of Windows, our product offers the option to prepare a WinPE based bootable media. Unlike the Linux/DOS recovery environment it can boast an excellent hardware support and the same interface as the Windows version can. However its system requirements are much tougher.

Features Overview

This chapter dwells upon key benefits and technical highlights of the product.

Features

Let us list some of the features:

User Friendly Fault Minimizing Interface

- **Graphical representation of the data** to gain a better understanding.
- A handy Launcher to easily find and run the required tasks.
- **Comprehensive wizards** to simplify even the most complex operations.
- **A context sensitive hint system** for all functions of the program.
- Previewing the resulting layout of hard disks before actually executing operations (so-called virtual operations).

Partition/Hard Disk Management Facilities

- Basic functions for initializing, partitioning and formatting hard disks (create, format, delete). Instead of the standard Windows disk tools, the program supports all popular file systems.
- Mount a partition (assign a drive letter) of any file system type to make it available for your operating system.

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Wipe Facilities

- **Data wiping** to successfully destroy all on-disk information including the standard bootstrap code and other system service structures.
- **Free space clearing** to destroy any remnants of deleted files/directories left on disk without affecting the used data.

Automatization Facilities

- **Task scheduling** to automate routine operations. It can be particularly effective when you have to repeat a sequence of actions on a regular basis.

Scheduling is only available for the Windows installation of the program.

- **Scripting** to make the program create a script of any set of operations you need. Besides support of all operations available in the interactive mode, the unattended mode provides some additional features, such as conditional execution, subroutines, repeatable iterations, disk/partition properties analysis, errors management, etc.

Auxiliary Facilities

- **File Transfer Wizard** to make such operations as transferring of files/directories or burning of them to CD/DVD as easy and convenient as possible. Providing access to Paragon backups as regular folders, it may also help to replace corrupted data from a previously created image in case of an operating system failure.
- **Network Configuration Wizard** to establish a network connection on a bootable recovery media either to save a backup of a partition/hard disk or just several files on a network computer or retrieve a previously made backup from a network computer for recovery purposes.
- **Boot Corrector** to fix most of the system boot problems that can be a result of a human factor, program error or a boot virus activity.

Boot Corrector is only available for the bootable recovery environment.

Supported Data Erasure Algorithms

- US DoD 5220.22-M
- US Navy standards NAVSO P-5239-26
- British HMG Infosec Standard No.5
- German VSItR Standard
- Australian ASCI 33
- Russian GOST R 50739-95
- Peter Gutmann's algorithm
- Bruce Schneier's algorithm
- Paragon's algorithm

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- Custom algorithm

To know more on the subject, please consult the Data Security Standards section.

Supported Technologies

Along with using innovative technologies from outside, Paragon has developed a number of its own original technologies that make its products unique and attractive for customers:

- **Paragon UFSD™** technology to browse partitions of any file system including hidden and unmounted, modify and copy files and folders, etc.
- **Paragon BTE™** technology to set tasks for execution during the system restart, thus saving from the need to use a bootable media when modifying system partitions.
- **Microsoft Dynamic Disk** (simple, spanned, striped, mirrored, RAID-5) to offer more management flexibility without the partition limitation of basic disks. Dynamic storage can be particularly beneficial for large-scale businesses when dealing with many physical hard disks involving complex setup.
- **GUID Partition Table** (GPT). It is the next generation of a hard disk partitioning scheme developed to lift restrictions of the old MBR. GPT disks are now supported by Windows Vista/7, Server 2008, Mac OS X and Linux.

Supported File Systems

- Full read/write access to FAT16/FAT32 partitions.
- Full read/write access to NTFS (Basic Disks) under Windows, Linux and PTS DOS. Compressed NTFS files are also supported.
- Full read/write access to Ext2FS/Ext3FS/Ext4FS partitions.
- Limited read/write access to Apple HFS+ partitions.

Unfortunately, support of non-Roman characters for the HFS+ file system is unavailable at the moment. The company is about to implement it in the nearest future.

Supported Media

- Support of both MBR and GPT hard disks (2.2TB+ disks included)
- IDE, SCSI and SATA hard disks
- SSD (Solid State Drive)
- AFD (Advanced Format Drive)
- Non-512B sector size drives
- CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW, DVD-R, DVD+R double layer and also Blu-ray discs
- FireWire (i.e. IEEE1394), USB 1.0, USB 2.0, USB 3.0 hard disks
- PC card storage devices (MBR and GPT flash memory, etc.)

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Getting Started

In this chapter you will find all the information necessary to get the product ready to use.

System Requirements

For the Windows installation package

- Windows XP SP3
- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1

During the installation additional free space (up to 1GB) will be required.

For the Linux bootable environment

- Intel Pentium CPU or its equivalent, with 300 MHz processor clock speed
- 256 MB of RAM
- SVGA video adapter and monitor
- Keyboard
- Mouse

For the WinPE bootable environment

- Intel Pentium III CPU or its equivalent, with 1000 MHz processor clock speed
- At least 1 GB of RAM
- SVGA video adapter and monitor
- Keyboard
- Mouse

Additional requirements

- Network card to send/retrieve data to/from a network computer
- Recordable CD/DVD drive to burn data to compact discs
- External USB hard drive to store data.

Installation

Before the installation, please make sure the systems requirements are met. If everything is OK, please do the following to install the product:

In case there is some previous version of the program installed on the computer, the program will offer the user to uninstall it first.

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1. Click on the *.MSI file. This application will guide you through the process of the program installation. The setup utility is compiled with the InstallShield SDK, hence it contains the standard user interface and set of installation steps.
2. The Welcome page will inform that the application is being installed. Click **Next** to continue.
3. Please Read Paragon License Agreement carefully and then select the appropriate option to accept. Otherwise you won't be able to proceed with the installation. By clicking the **Print** button, the license agreement may also be printed out.
4. Provide your product key and serial number.
5. On the Customer Information page you are to provide the standard customer information, i.e. a user name and an organization. Besides you need to decide whether to make the program available for all users of this computer (if several) or only for the current one.
6. On the next page, click **Change** to install the utility to a different location (by default **C:\Program Files\Paragon Software\ Paragon Disk Wiper 15**). Otherwise click **Next** to continue.

Do not install the program on network drives. Do not use Terminal Server sessions to install and run the program. In both cases, the program functionality will be limited.

7. On the Ready to Install the Program page click **Install** to start the installation or **Back** to return to any of the previous pages and modify the installation settings.
8. The Final page reports the end of the setup process. Click **Finish** to complete the wizard.

First Start

To start Paragon Disk Wiper 15 under Windows, please click the Windows Start button and then select **Programs > Paragon Disk Wiper ™ 15 > Paragon Disk Wiper™**.

The program provides wide opportunities in the field of hard disk structure modification, so just to be on the safe side, please make a backup of your data before carrying out any operation.

The first component that will be displayed is called the Express Launcher. Thanks to a well thought-out categorization and hint system, it provides quick and easy access to wizards and utilities that we consider worth using on a regular basis. With its help you can also start up the traditional launcher, the help system or go to the program's home page.

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To know more on how to handle the product's interface and accomplish typical operations, please consult the Windows Components chapter.

Building Recovery Media

WinPE- and/or Linux-based recovery environments should be prepared on-site with Paragon's Recovery Media Builder**.** To know more on the subject, please consult documentation that comes with this utility.

Booting from the Linux/DOS Recovery Media

The Linux/DOS recovery environment can be used to boot your computer into Linux or PTS DOS to get access to your hard disk for maintenance or recovery purposes. It also has the PTS DOS safe mode, which may help in a number of non-standard situations such as interfering hardware settings or serious problems on the hardware level. In this case, only basic files and drivers (such as hard disk drivers, a monitor driver, and a keyboard driver) will be loaded.

Startup

To start working with the Linux/DOS recovery environment, please take the following steps:

1. Start up the computer from our Linux/DOS recovery media.

Please use Recovery Media Builder to prepare Paragon's recovery environments on CD/DVD, flash, or in an ISO-image.

To automatically boot from the recovery media please make sure the on-board BIOS is set up to boot from CD/USB first.

2. Launch a boot mode you need (Normal, Safe, Low-Graphics Safe) in the Boot menu.

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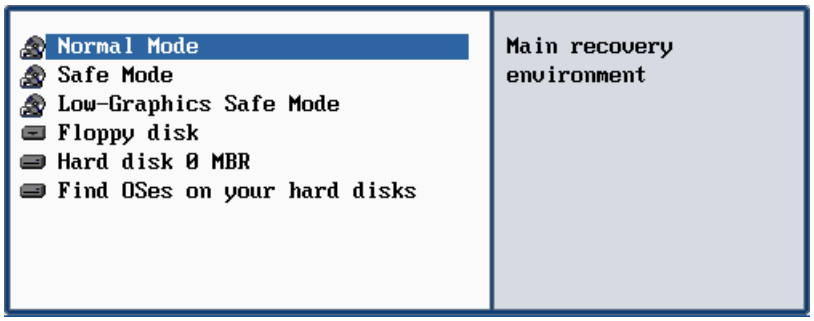
By default the Normal Mode will be automatically initiated after a 10 second idle period.

3. Click on the required operation to start. Hints on the selected at the moment item will help you make the right choice.
4. Consult the help system by pressing **ALT+F1** to know more on the subject.

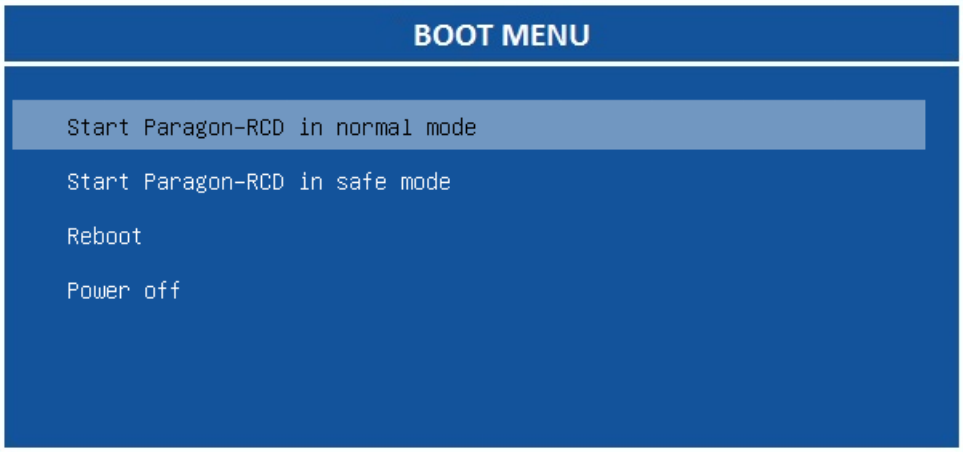
Boot menu

32-bit environment



- **Normal Mode**. Boot into the Linux normal mode. This mode uses the full set of drivers (recommended);
- **Safe Mode**. Boot into the PTS DOS mode. This mode can be used as an alternative of the Linux normal mode if it fails to work properly;
- **Low-Graphics Safe Mode**. Boot into the PTS DOS safe mode. In this case, only the minimal set of drivers will be included, like hard disk, monitor, and keyboard drivers. This mode has simple graphics and a simple menu;
- **Floppy Disk**. Reboot the computer from a system floppy disk;
- **Hard Disk 0**. Boot from the primary hard disk;
- **Find OS(s) on your hard disks**. The program will scan hard disks of your computer to find any bootable operating system.

64-bit environment



- **Normal Mode**. Boot into the Linux normal mode. This mode uses the full set of drivers (recommended);
- **Safe Mode**. Boot into the PTS DOS mode. This mode can be used as an alternative of the Linux normal mode if it fails to work properly;

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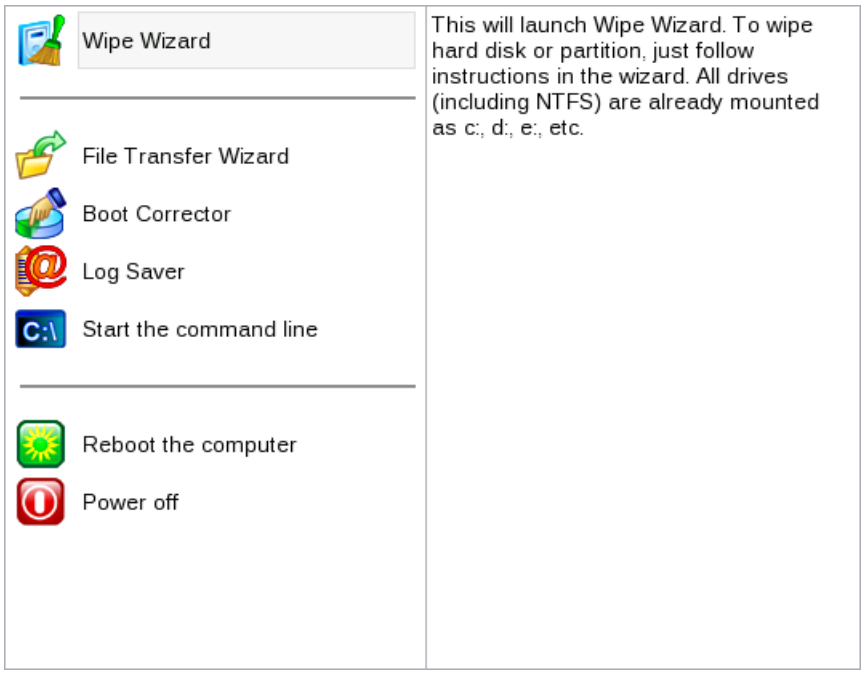
- **Reboot**. Restart the computer.
- **Power off**. Shut down the computer.

While working with the recovery environment you might experience some inconvenience caused by possible video artifacts. It is just a result of changing video modes and in no way will affect the program functionality. If this is the case, please wait a bit and everything will be OK.

Normal Mode

When the Normal mode is selected, the Linux launch menu appears:


Wipe Wizard
This will launch Wipe Wizard. To wipe hard disk or partition, just follow instructions in the wizard. All drives (including NTFS) are already mounted as c:, d:, e:, etc.
File Transfer Wizard
Boot Corrector
Log Saver
Start the command line
Reboot the computer
Power off

- **Wipe Wizard** (enables to destroy all on-disk information or only remnants of deleted files/directories);
- **File Transfer Wizard** (allows coping files/folders to another disk or a partition as well as recording them to CD/DVD);
- **Boot Corrector** (helps to correct the Windows System Registry without Windows being loaded);
- **Log Saver** (helps to collect and send the necessary log files to the Technical Support);
- **Command Line** (allows experienced users to execute any operation);
- **Reboot the computer**;
- **Power off the computer**.

To move within the menu, please use the arrow keys of the computer keyboard.

Safe Mode

When the Safe mode is selected, the PTS DOS launch menu appears. It has nearly the same functionality as for the Normal mode except for the **Network Configurator** and **Log Saver** commands. Besides due to certain limitations of the PTS DOS environment, there is no possibility to burn CD/DVD discs.

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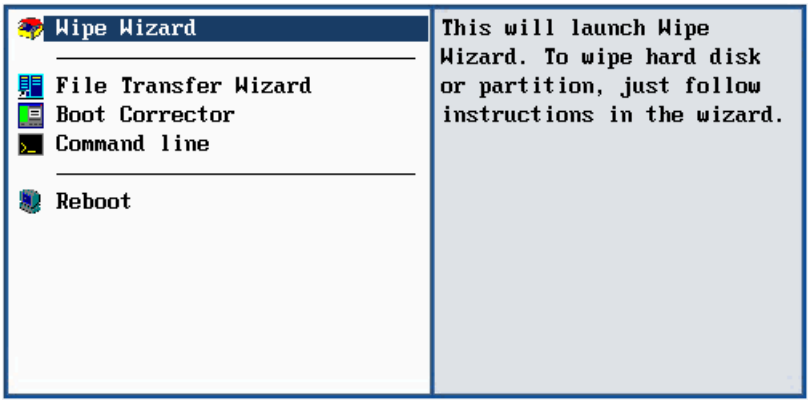
Low Graphics Safe Mode

When the Low Graphics mode is selected, the PTS DOS launch menu appears. It has the same functionality and looks similar to the Safe mode but graphically simpler.


Wipe Wizard
File Transfer Wizard
Boot Corrector
Command line
Reboot
This will launch Wipe Wizard. To wipe hard disk or partition, just follow instructions in the wizard.

Booting from the WinPE Recovery Media

The WinPE recovery environment can be a real alternative to the Linux/DOS recovery environment. Providing nearly the same level of functionality it offers an excellent hardware support and the same interface as the Windows version does.

Startup

To start working with the WinPE recovery environment, please take the following steps:

1. Start up the computer from the WinPE recovery media.

Please use Recovery Media Builder to prepare Paragon's recovery environments on CD/DVD, flash, or in an ISO-image.

To automatically boot from the recovery media please make sure the on-board BIOS is set up to boot from CD/USB first.

2. Once it has been loaded, you will see the Universal Application Launcher. In general it enables to run components of the product, load drivers for undefined hardware or establish a network connection.

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3. Click on the required operation to start. Hints on the selected at the moment item will help you make the right choice.
4. Consult the help system by pressing **ALT+F1** to know more on the subject.

The WinPE based recovery environment offers excellent hardware support. However in case it doesn't have a driver for your disk controller, your hard disks will be unavailable. Please consult the Adding specific drivers scenario to know how to tackle this issue.

Basic Concepts

This chapter explains terms and ideas that show how the program works. To understand these helps to obtain a general notion of the operation performance and makes it easier for the user to operate the program.

Data Sanitization

Data security is a two-sided problem. It is to be made clear, that providing confidentiality implies not only information to be stored properly, but also be destroyed according to certain rules. The first step to protecting yourself is to know exactly which security precautions work and which do not.

Many people believe the misconception that repartitioning a disk will result in complete destruction of its contents. Actually that is not quite so. Repartitioning the drive only alters references to partitions in the Partition Table, leaving all file data intact. In fact, there are a number of programs available to successfully recover previously deleted partitions.

Formatting a drive also does not guarantee data destruction. Formatting procedure implies modification of the Master File Table (MFT) that keeps track of where file contents are stored on the disk and verification of each sector for consistency. Even a low-level format does not actually erase the file contents for good, since they can still be resurrected from their deleted state with minimal effort by using the popular today Magnetic Force Microscopy technology.

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The only way to make sure that all the data has been erased from a hard drive is to overwrite all on-disk sectors with random patterns of ones and zeros. Although this sounds complex, there is an easy way to do this.

The process of deliberately, irreversibly removing or destroying the data stored on a memory device (magnetic disks, flash memory drives, etc.) is generally known as Data Sanitization. A device that has been sanitized has no usable residual data and even advanced forensic tools should not ever be able to recover it, thus providing maximum level of security.

Data Security Standards

To irreversibly destroy all on-disk information there have been developed a number of disk sanitizing standards. They are distinguished by wiping patterns and number of passes:

1. **US DoD 5220.22-M**. US Department of Defense recommends to overwrite all addressable locations with a character, its complement and then a random character. Finally, the target data area is to be verified;
2. **US Navy standards NAVSO P-5239-26**.
    - **NAVSO P-5239-26 for RLL encoded drives**. At first to write the fixed value (0xffffffff) to the target data area, then the fixed value (0x27ffffff), and then random values. Finally, the target data area is to be verified;
    - **NAVSO P-5239-26 for MFM encoded drives**. At first to write the fixed value (0xffffffff) to the target data area, then the fixed value (0xbfffffff), and then random values. Finally, the target data area is to be verified;
3. **British HMG Infosec Standard No.5**. At first to write a single character pattern, then its complement and then a random character. Finally, the target data area is to be verified;
4. **German VSItR Standard**. Overwrite the deleted information 7 times, consistently filling it with the following patterns: 0x00, 0xFF, 0x00, 0xFF, 0x00, 0xFF, 0xAA. Finally, the target data area is to be verified;
5. **Australian ASCI 33**. Overwrite with a character (C), then verify. Overwrite with –C (the first pass character's inverse), then verify again. Overwrite everything with both C and –C once again but without verification. Fill everything with random characters;
6. **Russian GOST R 50739-95**. Destroy information by a single pass with writing random characters into each sector byte;
7. **Peter Gutmann's algorithm**. A whopping 35 passes, with 27 random-order passes using specific patterns combined with eight passes using random patterns;
8. **Bruce Schneier's algorithm**. Two passes of specific patterns followed by five passes using a cryptographically secure pseudo-random sequence;
9. **Paragon's algorithm**.
    - Overwrite each sector with a forcefully randomized 512-byte string, new for each sector, using CSPRNG (cryptographically secure pseudo-random number generator);
    - Overwrite each erased sector with its complement;
    - Overwrite each sector with a 512-byte string (CSPRNG), again forcefully randomized and different from the first pass, and new for each sector;
    - Fill each erased sector with 0xAA value. Finally, the target data area is to be verified.

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Military and government standards always require 100 percent residual data verification. It is necessary to make sure that the operation has been properly accomplished. Besides corrupted sectors discovered during the operation are to be logged to keep the user informed, since these sectors may contain classified information.

The list of supported military and government standards may vary for your product. Anyway you've always got the possibility to create a customized algorithm, defining up to 4 wiping patterns, number of passes for each wiping pattern and for the group of patterns, thus providing the maximum possible security level.

Scheduling

The automation of operations is particularly effective when you have to repeat a sequence of actions on a regular basis. For example, developing a specific project on a day-to-day basis and having to make a backup every evening so as not to lose the valuable data, you will really appreciate, when this kind of routine operations will be carried out automatically without your participation.

Another aspect of any automation process is that it allows an optimization of your computer's work-load. This is especially important when operations require a considerable amount of computer resources – processor time, memory and more. A number of tasks, which can decrease the performance, can be run during the night or whenever the computer has the least work-load to perform.

The program has a special tool for scheduling. You can set out a timetable for any operation and it will start at a specified time without interrupting your current activity.

Windows Components

In the given section you can find all the information necessary to successfully work with the Windows version of the product.

Interface Overview

This chapter introduces the graphical interface of the program. The design of the interface precludes any mistake being made on the part of the user. Most operations are performed through the system of wizards. Buttons and menus are accompanied by easy understandable icons. Nevertheless, any problems that might occur while managing the program can be tackled by reading this very chapter.

General Layout

When you start the program, the first component that is displayed is called the Launcher. It enables to run wizards and dialogs, to specify program settings, to visualize the operating environment and the hard disk configuration.

The Launcher's window can be conditionally subdivided into several sections that differ in their purpose and functionality:

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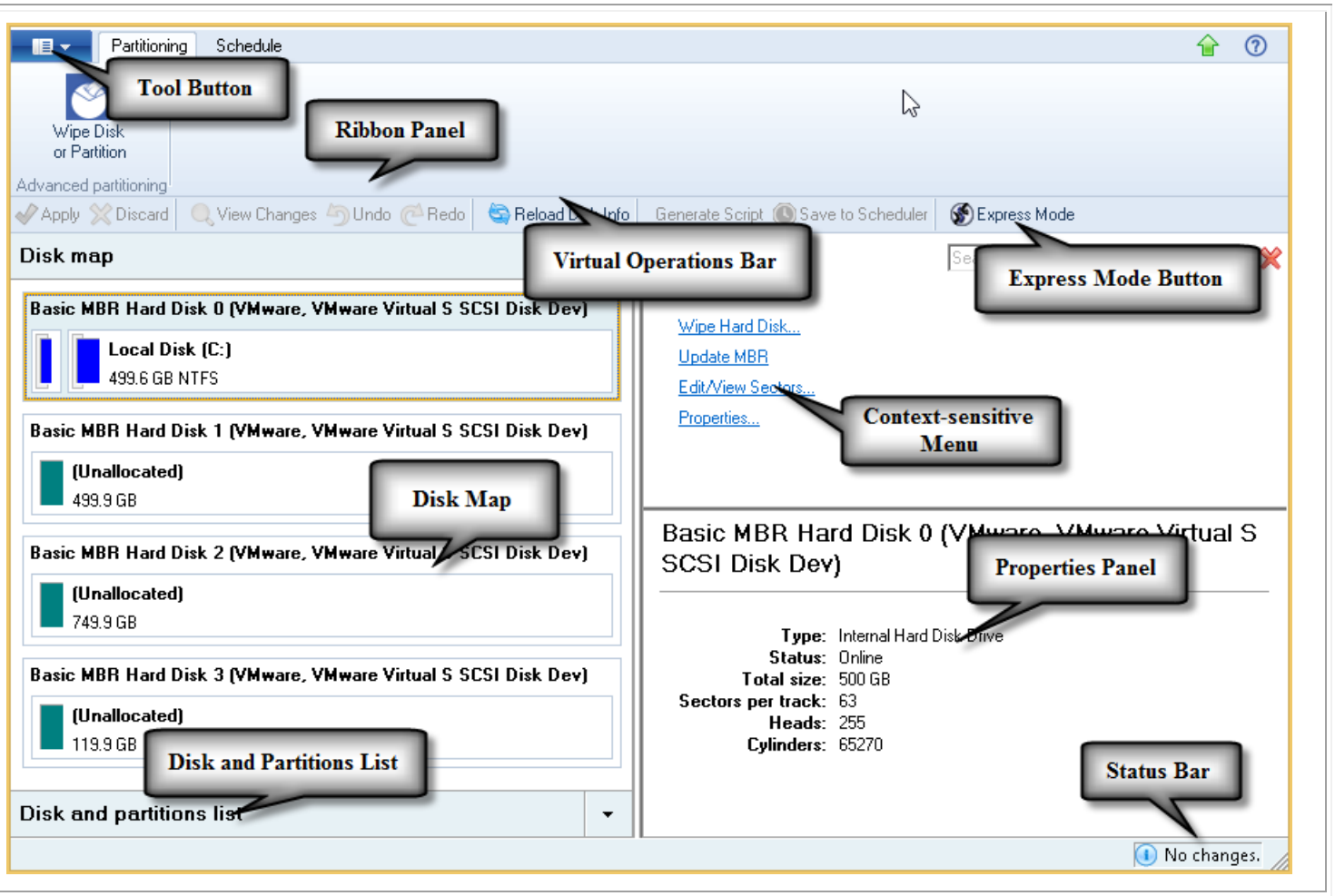

1. Tool Button
2. Ribbon Panel
3. Virtual Operations Bar
4. Express Mode Button
5. Disk Map
6. Disk and Partitions List
7. Context-sensitive Menu
8. Properties Panel
9. Status Bar

A number of panels offer similar functionality with a synchronized layout. The program enables to conceal some of them to simplify the interface management.

Tool Button

By clicking on this button the user can:

- Launch auxiliary wizards,
- Get access to the program settings,
- Collect and send a log files package to the Support Team,
- Go to Paragon's website to download a free update, register the product, visit Paragon's Knowledge Base, etc.

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Ribbon Panel

An area across the top of the program's window is called the Ribbon Panel. It makes almost all the product capabilities available to the user in a single place. A Ribbon Tab is an area on the panel that contains buttons organized in groups by functionality. Each button corresponds to a certain program wizard or dialog.

If you'd like to hide all ribbon tabs, click on the arrow button at the right top corner of the program window.

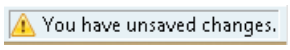
Virtual Operations Bar

The program supports previewing the resulting layout of hard disks before actually executing operations (so-called virtual mode of execution). In fact, when the virtual mode is enabled, the program does not accomplish operations immediately, but places them on the List of Pending Operations for later execution.

The Virtual Operations Bar enables to manage pending operations.

BUTTON	FUNCTIONALITY
	Cancel the last virtual operation on the List of Pending Operations
	Cancel the last undo virtual operation on the List of Pending Operations
	Display the List of Pending Operations
	Launch the real execution of virtual operations
	Cancel all virtual operations on the List of Pending Operations
	Generate a script out of all pending operations
	Schedule pending operations

Virtual mode is an effective way of protection from any troubles, since no operations will be executed until clicking the Apply button for confirmation, thus giving a second chance to weigh all pros and cons of this or that particular operation. The program politely reminds the user that there are unsaved changes by showing the following window:



Express Mode Button

By clicking on this button the user can switch to the express mode of operation at any time.

Disk Map

As the name infers, the Disk Map displays the layout of physical and logical disks. Physical disks are represented with rectangle bars that contain small-sized bars. These small-sized bars represent logical disks. Their color depends on the file system of the appropriate partition. By looking at the size of the bar's shaded area it is possible to estimate the used disk space. For the selected at the moment object there's the possibility to call a context-sensitive popup menu with available operations.

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Large-sized bars display the following information about physical disks:

- Type (basic or dynamic MBR/GPT),
- Manufacturer,
- Model.

Small-sized bars display the following information about logical disks and blocks of free space:

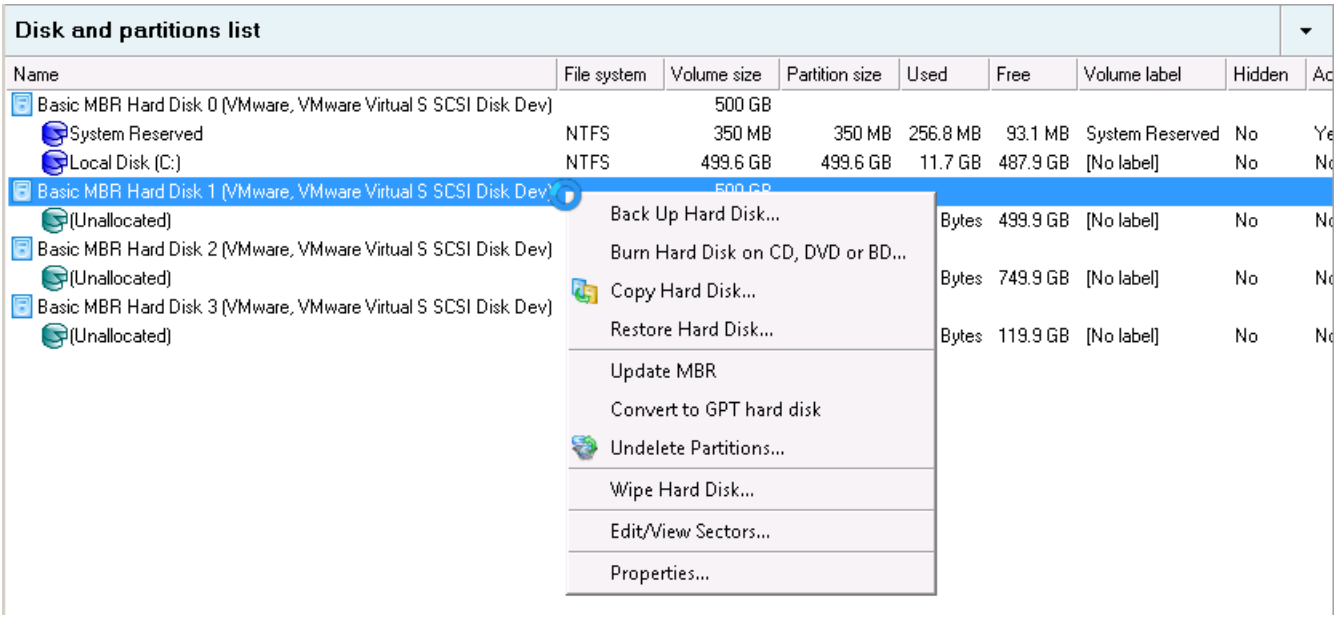
- Volume label (if exists),
- Drive letter,
- Total size,
- File system.

The Disk Map is synchronized with the Context-sensitive Menu and the Properties Panel. Thus by selecting a disk on the map, the two will automatically display detailed information on it. To know more on the subject, please consult the Viewing Disk Properties chapter.

Since the Disk Map and the Disk and Partitions List have the same purpose, the user is allowed to extend only one at the moment by using a corresponding arrow button.

Disk and Partitions List

The Disk and Partitions List is another helpful tool that helps to get a clear-cut picture on the current state of the system hard disks and partitions. All objects (disks, partitions, or blocks of free space) on the list are sorted according to their starting position. For every item there is the possibility to call a context-sensitive popup menu with available operations.



The Disk and Partitions List provides detailed information on all hard disks and partitions found in the system including the following properties:

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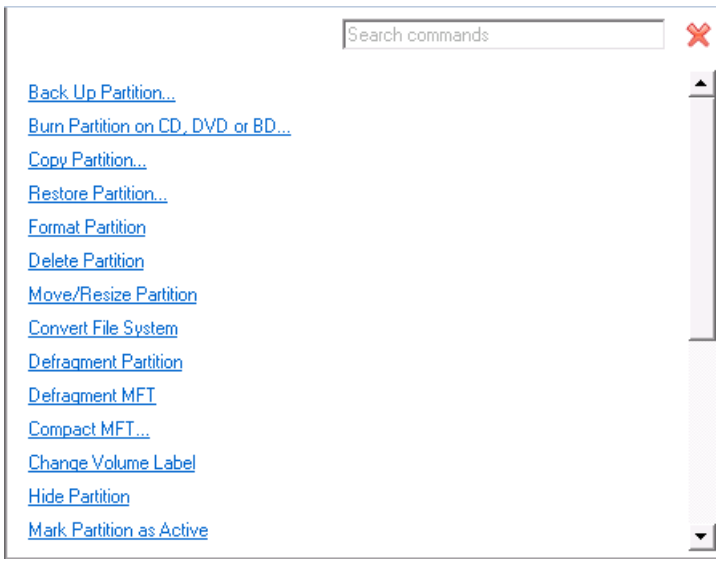
- Name,
- Volume label (if exists),
- Drive letter,
- File system type,
- Volume size,
- Amount of used and unused (free) space,
- Active/Inactive attribute,
- Hidden/Unhidden attribute.

The Disk and Partitions List is synchronized with the Context-sensitive Menu and the Properties Panel. Thus by selecting a disk on the list, the two will automatically display detailed information on it. To know more on the subject, please consult the Viewing Disk Properties chapter.

Since the Disk Map and the Disk and Partitions List have the same purpose, the user is allowed to extend only one at the moment by using a corresponding arrow button.

Context-sensitive Menu

The Context-sensitive Menu shows a list of operations available for an object (disk, partition, or block of free space) selected either on the Disk Map or the Disk and Partitions List. If you click a corresponding record the appropriate wizard or dialog will be started. All default values for the operation parameters will correspond to the object's settings. If there too many items on the list, type in the first word of the required command in the **Search commands** field to filter the list.



Properties Panel

The Properties Panel provides information on the object (disk, partition, or block of free space) selected either on the Disk Map or the Disk and Partitions List.

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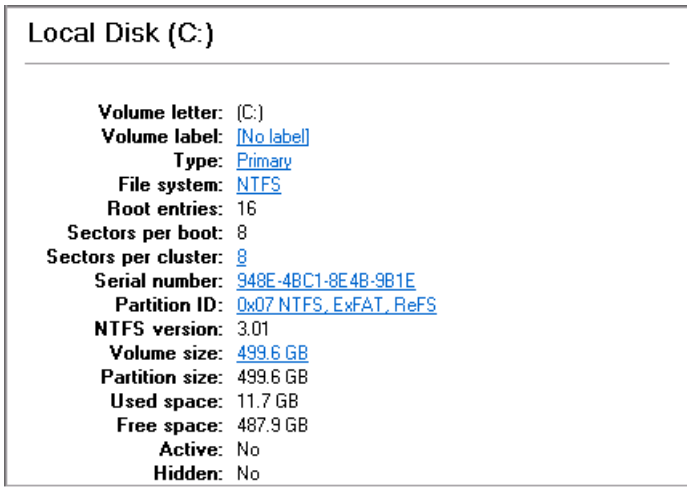

The Properties Panel helps to obtain the following data:

For a hard disk

- Model,
- Serial number,
- Type of hard disk (basic or dynamic MBR/GPT),
- Total size (in GB),
- Information on geometry of the disk (amount of sectors per track, heads and cylinders).

For a partition

- Drive letter assigned to the disk,
- Volume label (if exists),
- Type of the logical disk,
- File system,
- Root entries,
- Serial number,
- NTFS version,
- Partition ID,
- Total size, used space and free space (in GB), etc.

Besides you can modify practically any partition property by clicking on the required value.

For a block of free space

- Total size (in GB).

Status Bar

This is the bottom part of the main window. The Status Bar displays menu hints, for each item the cursor points to.

Settings Overview

To call the Settings dialog, please click **Tool Button**, then select **Settings**. All the settings are grouped into several sections, which functions are described in the following paragraphs. The list of sections is placed on the left side of the dialog. By selecting a section from the list, you can open a set of options.

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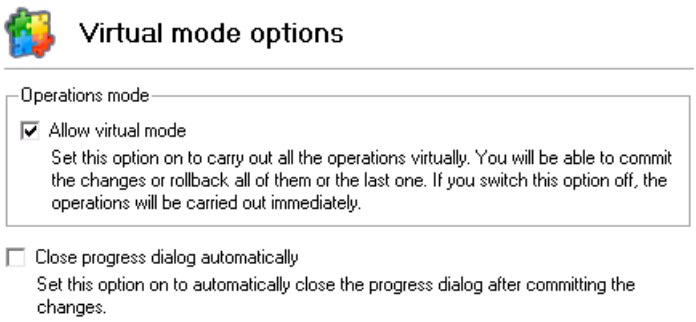
To get a detailed description to any setting, control, or field of the program just click the hint button and then the object you need.

Application Section

Virtual mode options


Virtual mode options
Operations mode
Allow virtual mode
Set this option on to carry out all the operations virtually. You will be able to commit the changes or rollback all of them or the last one. If you switch this option off, the operations will be carried out immediately.
Close progress dialog automatically
Set this option on to automatically close the progress dialog after committing the changes.

In this section you may configure the virtual mode:

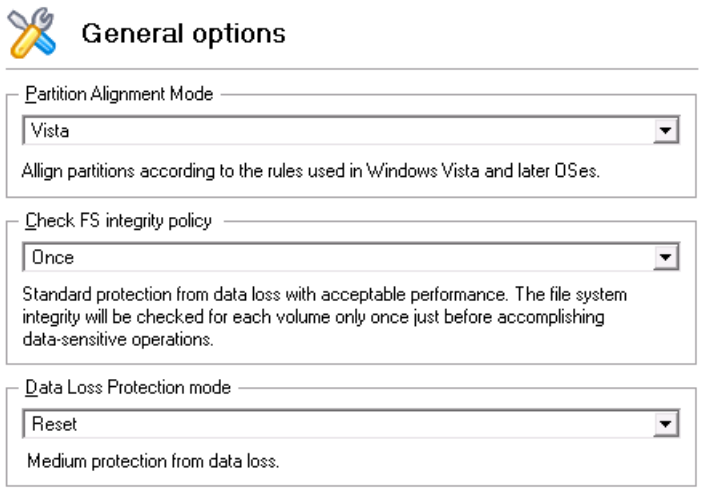
- **Allow virtual mode**. Mark the checkbox to enable the virtual mode. It is an effective way of protection from any troubles, since no operation will be executed until confirmation, thus giving you a second chance to weigh all pros and cons of this or that particular operation.

We strongly recommend you to enable this mode.

- **Close progress dialog automatically**. Mark the checkbox to automatically close the progress dialog after accomplishing operations.

Partitioning Section

General options


General options
Partition Alignment Mode
Vista
Allign partitions according to the rules used in Windows Vista and later OSes.
Check FS integrity policy
Once
Standard protection from data loss with acceptable performance. The file system integrity will be checked for each volume only once just before accomplishing data-sensitive operations.
Data Loss Protection mode
Reset
Medium protection from data loss.

This section contains a set of general options that will be taken into account during any operation carried out with the program:

- **Partition Alignment mode**. There are three options you can choose from:

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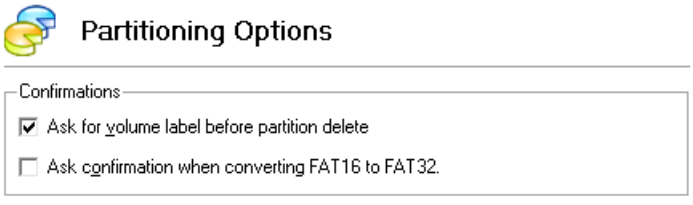
- **Legacy**. DOS and Windows OSes before Vista required that partitions had to be aligned to the "disk cylinder" or 63 sectors to address and access sectors correctly. It was OK, until 4K hard drives came into scene. When partitions are aligned this way on this type of disk, each logical cluster is linked to two physical 4K clusters, thus resulting in a double read-write operation.
- **Vista**. Since Windows Vista, operating systems do not use the archaic CHS (cylinder/head/sector) addressing scheme, but the Logical Block Addressing (LBA), where sectors are addressed continuously over the whole disk drive. It is optimal for both, 512B and new 4K disk drivers.
- **Inheritance**. Select the option to disable automatic alignment of partitions.

- **Check FS integrity policy**. Accomplishment of any data-sensitive operation (resize, move, merge, redistribute, change cluster size, etc.) is potential with data loss. To minimize this risk, it's recommended to check integrity of your file system before this type of operations, despite the fact that it's quite time consuming. We offer you several options to let you choose, which is best for you:
  - **Always**. Maximum protection, but minimal performance. The file system integrity will be checked each time it's necessary to guarantee the maximum protection for the on-disk data.
  - **Once**. Standard protection with acceptable performance. The file system integrity will be checked for each volume only once just before accomplishing data-sensitive operations.
  - **Never**. No protection, but maximum performance. If you're not 100% sure your disk is rock solid, please do not use this option.
- **Data Loss Protection mode**. To guarantee safety for your information when a data-sensitive operation has been abruptly interrupted as a result of a computer reset, or a power outage, there are several techniques, that correspond to the options below:
  - **Do not protect**. No protection, but maximum performance. If you're not 100% sure you're completely safe from a power outage, or an accidental reset of your computer, please do not use this option.
  - **Reset**. Standard protection with acceptable performance. Maintaining a special journal, our program enables to automatically complete a data-sensitive operation interrupted by an accidental reset of your computer from our bootable recovery media, thus reviving the corrupted partition.
  - **Power loss**. Maximum protection, but minimal performance. Besides journaling, our program will also disable cache of your disk when accomplishing data-sensitive operations to avoid data loss even in case of a power outage.

Partitioning options


Partitioning Options
Confirmations
Ask for volume label before partition delete
Ask confirmation when converting FAT16 to FAT32.

This section contains a set of options that will be taken into account during partitioning operations:

- **Request confirmation before partition deletion**. Mark the checkbox to activate an additional security mechanism. Thus when going to delete a partition you will be automatically requested to enter its label.
- **Request confirmation when converting FAT16 to FAT32**. Mark the checkbox to automatically request confirmation before converting FAT16 to FAT32. There are a number of situations when this kind of conversion is the only way out to accomplish the operation. For instance, you are going to migrate your system to a larger

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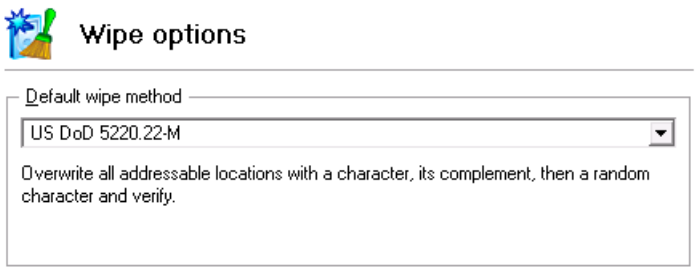
hard disk with the proportional resize of existing partitions, what is very convenient. As a result you can get original FAT16 partitions go beyond the 4GB limit. Thus without conversion to FAT32, this operation will in no way be possible to accomplish. The same goes for any copy hard disk/partition or restore hard disk/partition operation involving an extra upsizing.

Wipe Section

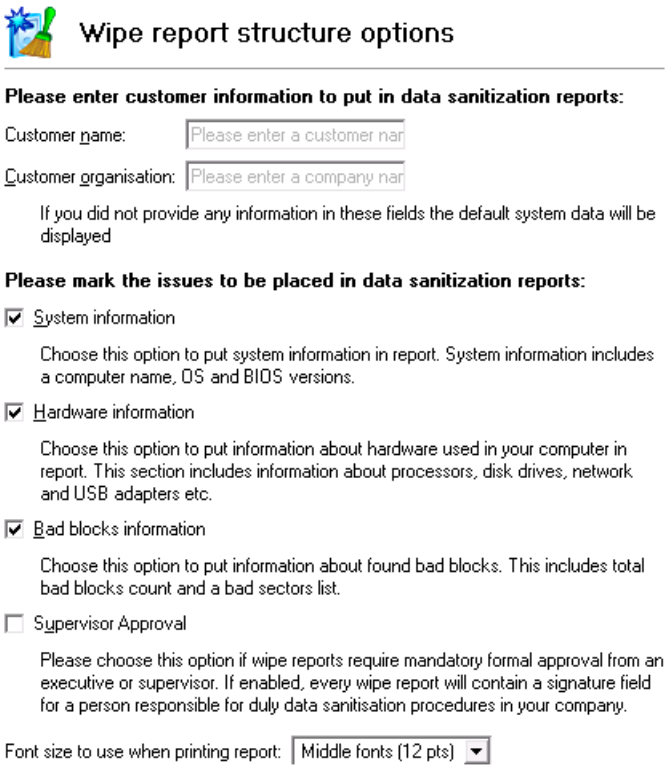
Wipe options


Wipe options
Default wipe method
US DoD 5220.22-M
Overwrite all addressable locations with a character, its complement, then a random character and verify.

Here you can set a specific data erasure algorithm that will be used by default during wipe operations.

The list of supported military and government standards may vary for your product.

Wipe report options


Wipe report structure options
Please enter customer information to put in data sanitization reports:
Customer name:
Please enter a customer nar
Customer organisation:
Please enter a company nar
If you did not provide any information in these fields the default system data will be displayed
Please mark the issues to be placed in data sanitization reports:
System information
Choose this option to put system information in report. System information includes a computer name, OS and BIOS versions.
Hardware information
Choose this option to put information about hardware used in your computer in report. This section includes information about processors, disk drives, network and USB adapters etc.
Bad blocks information
Choose this option to put information about found bad blocks. This includes total bad blocks count and a bad sectors list.
Supervisor Approval
Please choose this option if wipe reports require mandatory formal approval from an executive or supervisor. If enabled, every wipe report will contain a signature field for a person responsible for duly data sanitisation procedures in your company.
Font size to use when printing report:
Middle fonts (12 pts)

In this section you can specify contents and properties of generated wipe reports:

- **System information**. Mark the option to include a computer name, BIOS version and the used operating system.

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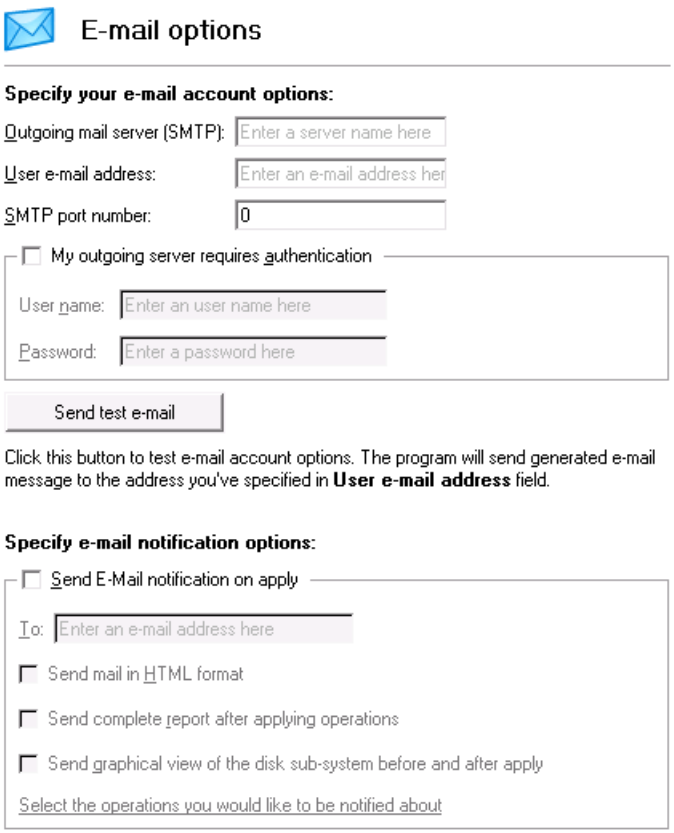
- **Hardware Information**. Mark the option to include information on the used processor, disk drivers, network and USB adapters, etc.
- **Bad blocks information**. Mark the option to include information on the found bad blocks.
- **Supervisor Approval**. Mark the option to add a signature field for an executive or supervisor responsible for data sanitization procedures in your company.
- **Font size…** Select the most suitable font size from the list (12 pts by default).

E-mail Notifications and Logging Section

E-Mail options


E-mail options
Specify your e-mail account options:
Outgoing mail server (SMTP):
Enter a server name here
User e-mail address:
Enter an e-mail address her
SMTP port number:
0
My outgoing server requires authentication
User name:
Enter an user name here
Password:
Enter a password here
Send test e-mail
Click this button to test e-mail account options. The program will send generated e-mail message to the address you've specified in User e-mail address field.
Specify e-mail notification options:
Send E-Mail notification on apply
To:
Enter an e-mail address here
Send mail in HTML format
Send complete report after applying operations
Send graphical view of the disk sub-system before and after apply
Select the operations you would like to be notified about

This section contains a set of options that will be taken into account during the Send log files and Send e-mail notification operations:

- **Outgoing mail server (SMTP)**. To send messages by using the built-in mail client, it is necessary to have access to a computer running an SMTP (Simple Mail Transfer Protocol) server. All outgoing messages are first sent to the SMTP server, which in its turn delivers them to the required recipients. The address may be represented as a traditional Internet host name (e.g.: mail.com) or as an IP numeric address (e.g. xxx.xxx.xxx.xx).
- **User e-mail address**. Specify an e-mail address that has been assigned by the Internet Service Provider or organization's e-mail administrator.
- **My outgoing server requires authentication**. Activate the option to allow the program to make authentication on the server before sending messages.

  - User name. Enter the name that will be used to log in to the e-mail account.

  - Password. Enter the password that will be used to access the mail server.

When you're ready with the settings, click on the **Send test e-mail** button to check if everything is OK.

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- **Send e-mail notification on apply**. Specify an e-mail to send notifications on the carried out operations.

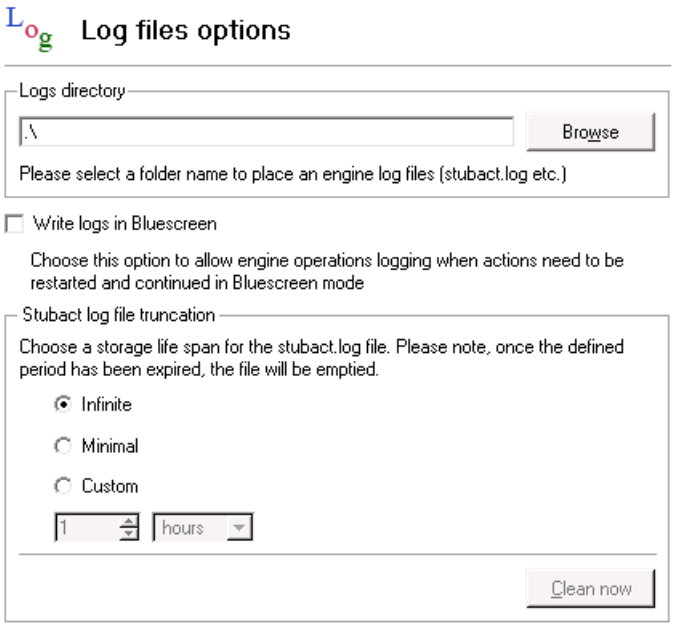
  - **Send mail in HTML format**. Activate the option to create messages in the HTML format instead of plain text.

  - **Send complete report after applying operations**. Activate the option to create an in-depth report on the carried out operations and send it after performing the last operation.

  - **Send graphical view of the disk sub-system before and after apply**. Activate the option to allow the program to attach two pictures of the disk layout made before and after the operation is completed.

By clicking the link at the bottom of the window you can jump to the Operation dependency options.

Log files options


Log files options
Logs directory
.\
Browse
Please select a folder name to place an engine log files (stubact.log etc.)
Write logs in Bluescreen
Choose this option to allow engine operations logging when actions need to be restarted and continued in Bluescreen mode
Stubact log file truncation
Choose a storage life span for the stubact.log file. Please note, once the defined period has been expired, the file will be emptied.
Infinite
Minimal
Custom
1
hours
Clean now

In this section you can set up the program logging engine:

- **Logs directory** to specify location of program log files. By default, all logs are placed to: **C:\Program Files\Paragon Software\product's name\program**
- **Write logs in Bluescreen** to enable the program logging in a special boot-up mode
- **Stubact log file truncation** to specify a storage life span for the stubact.log file:
  - **Infinite** not to empty the file ever;
  - **Minimal** to have the file emptied all the time;
  - **Custom** to set a certain storage life span for the file. Please note, once the defined period has been expired, the file will be emptied.

We strongly recommend you not to choose the Minimal option, as in case of having problems with the program, our Support Team won't be able to study operation logs, thus help you out.

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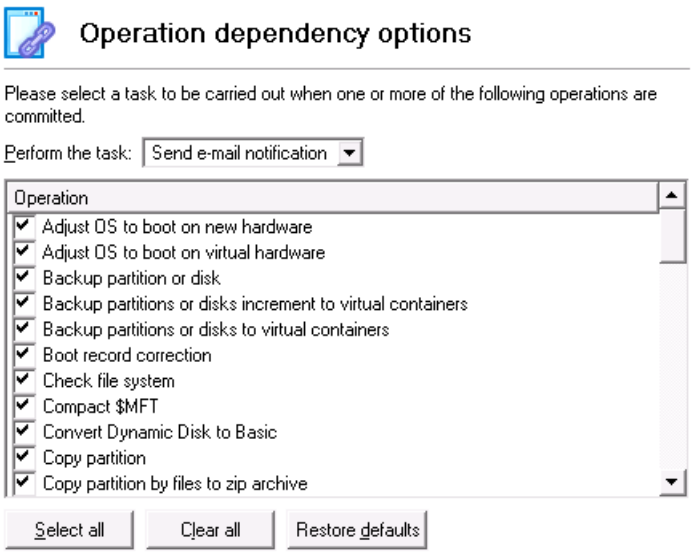
Operation dependency options


Operation dependency options
Please select a task to be carried out when one or more of the following operations are committed.
Perform the task:
Send e-mail notification
Operation
Adjust OS to boot on new hardware
Adjust OS to boot on virtual hardware
Backup partition or disk
Backup partitions or disks increment to virtual containers
Backup partitions or disks to virtual containers
Boot record correction
Check file system
Compact $MFT
Convert Dynamic Disk to Basic
Copy partition
Copy partition by files to zip archive
Select all
Clear all
Restore defaults

This section contains a set of options that will be taken into account when the Send e-mail notification on apply function is enabled. By marking/unmarking a checkbox opposite the required operation you can choose whether to receive an e-mail notification on its completion or not.

You won't be notified if an operation requires the system restart.

Viewing Disk Properties

The Disk Map and the Disk and Partitions List are the main tools to get information on the properties of hard disks and partitions available in the system. To know more on the subject, please consult the corresponding chapters of the Interface Overview chapter.

Partition Management

In this chapter you will find all the information necessary to carry out partitioning operations supported by the program.

Basic Partitioning Operations

Here you can learn how to accomplish basic partitioning operations (create, format, delete).

Creating Partitions

The program provides the ability to create a new partition within a block of un-partitioned space.

Restrictions

1. Do not use the Create Partition function in order to undelete the last deleted partition.
2. The program allows creating new partitions only within blocks of un-partitioned space. It cannot convert a free space on an existing partition to a new partition.
3. The program cannot create new partitions on Dynamic Disks.

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Express Create Partition Wizard Startup

- Click the **Partitioning** tab on the Ribbon Panel, then select **Express Create**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Create Partition Wizard Startup

- Click the **Partitioning** tab on the Ribbon Panel, then select **Create Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

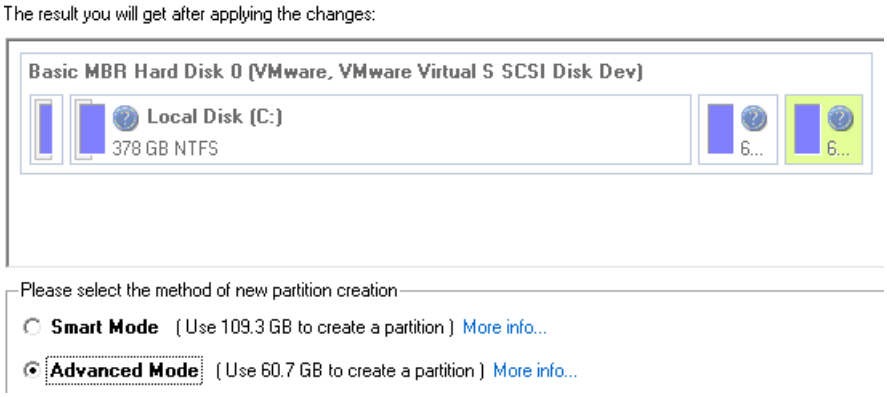
Dialog Startup

1. Select a block of free space on the Disk Map;
2. Call a context menu for the selected object by the right mouse click, then select **Create Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Express Create Partition Wizard Setup

Thanks to a highly intelligent work algorithm, the wizard requires minimal involvement in the operation, thus you only need to choose a method you find the most suitable to create the partition (if several available), which actually differ in the amount of space to allocate. For easy perception, you can see the resulted disk layout on the disk map by selecting this or that mode.


The result you will get after applying the changes:
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
378 GB NTFS
6...
6...
Please select the method of new partition creation
Smart Mode (Use 109.3 GB to create a partition) More info...
Advanced Mode (Use 60.7 GB to create a partition) More info...

The number of available methods depends on your disk layout.

To learn more on the way the wizard works, please click the corresponding link on the first page of the wizard.

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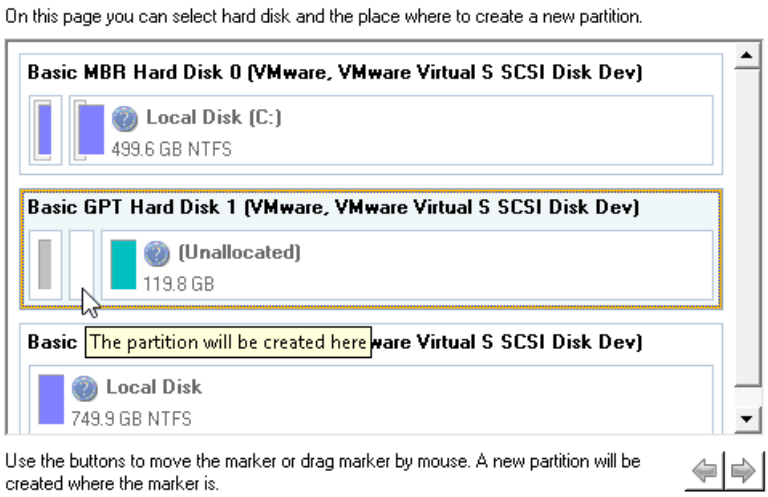
Create Partition Wizard Setup

The wizard offers the following steps to accomplish the operation:

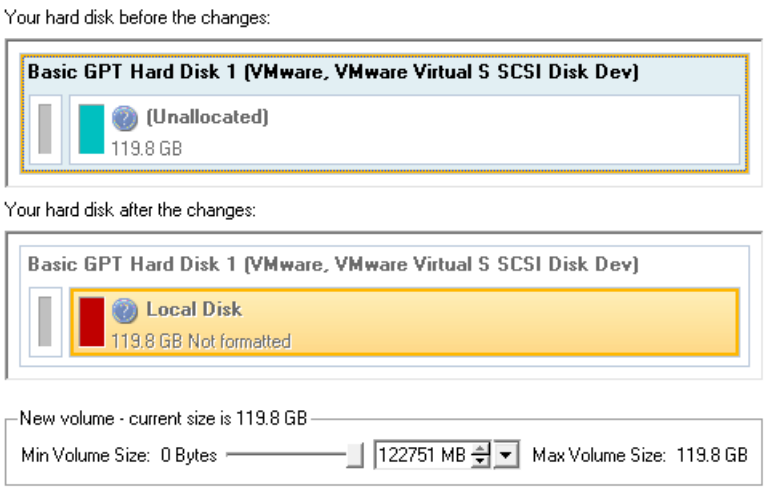
- **Partition destination**. Select a hard disk (if the computer has several hard disks) and then choose position for the future partition on the disk: at the end (preferable), at the beginning or somewhere in the middle between other partitions.


On this page you can select hard disk and the place where to create a new partition.
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
499.6 GB NTFS
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
119.8 GB
Basic
The partition will be created here
ware Virtual S SCSI Disk Dev)
Local Disk
749.9 GB NTFS
Use the buttons to move the marker or drag marker by mouse. A new partition will be created where the marker is.

By default, the program allows you to create a new partition only as the last primary or as the last logical drive within the extended partition. However, by activating the advance mode on the first page of the wizard you can remove this restriction that in its turn might result in some boot problems.

- **Partition size**. There is no restriction on size of the future partition, merely depending on space available on the hard disk.

  If there is not enough free space in one block, the wizard enables to redistribute free space, joining all free space blocks together into one united block and moving partitions when necessary. If the total amount of free space is still not enough, it is possible to split a fragment of space from one of the existing partitions, thus resizing it.


Your hard disk before the changes:
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
119.8 GB
Your hard disk after the changes:
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk
119.8 GB Not formatted
New volume - current size is 119.8 GB
Min Volume Size: 0 Bytes
122751 MB
Max Volume Size: 119.8 GB

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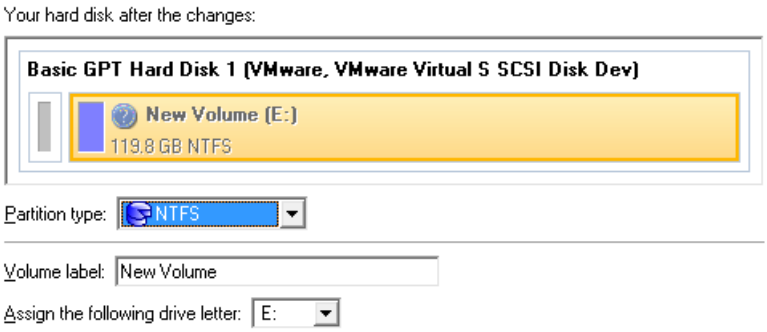
If a partition to resize is locked and cannot be processed, the wizard makes the system reboot to create the partition and then automatically boots the system again. (The rebooting mechanism is different for different versions of Windows.)

You can also choose whether the future partition will be primary or logical by marking the appropriate checkbox.

- **Partition properties**. On the next page of the wizard you can set a number of additional parameters:


Your hard disk after the changes:
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
New Volume (E:)
119.8 GB NTFS
Partition type: NTFS
Volume label: New Volume
Assign the following drive letter: E:

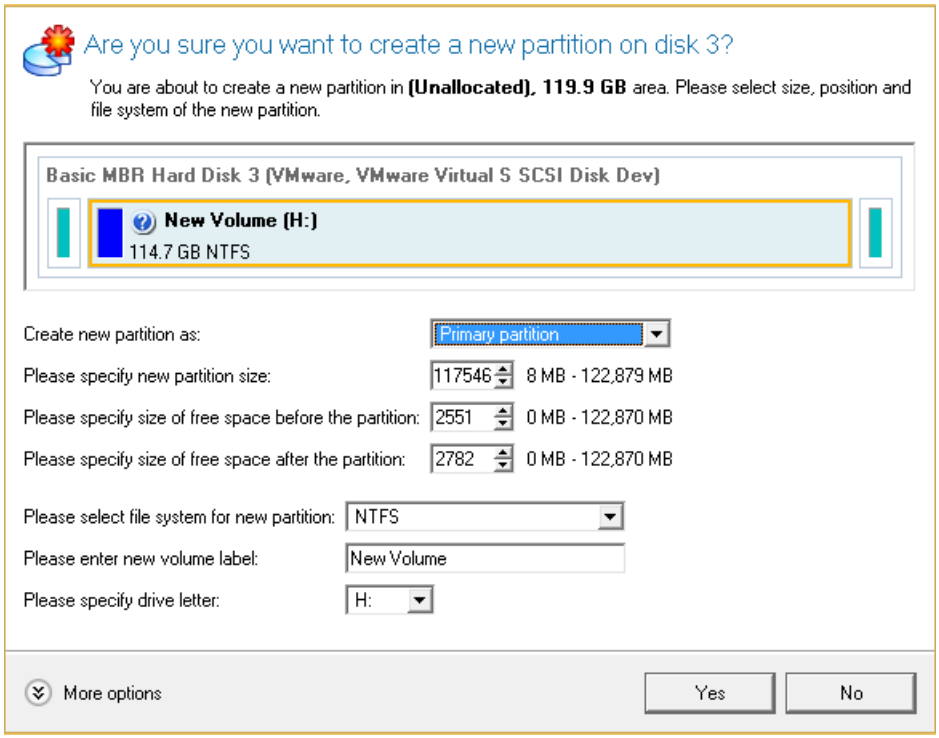
- **Partition type**. From the pull-down list select a file system the newly created partition will be formatted to, otherwise the partition will remain unformatted (so that it will not be ready to use).

- **Volume label**. Enter a label for the selected partition in this textual field. It is an irrelevant parameter usually used for drive identification.

- **Surface test level**. Define the level of the surface check to make the program find bad and unstable sectors and mark them unusable in the file system metadata.

Dialog Setup

Initially the program suggests some consistent values for all parameters. In most cases, you can just press the Yes button to confirm the operation.


Are you sure you want to create a new partition on disk 3?
You are about to create a new partition in (Unallocated), 119.9 GB area. Please select size, position and file system of the new partition.
Basic MBR Hard Disk 3 (VMware, VMware Virtual S SCSI Disk Dev)
New Volume (H:)
114.7 GB NTFS
Create new partition as: Primary partition
Please specify new partition size: 117546 8 MB - 122,879 MB
Please specify size of free space before the partition: 2551 0 MB - 122,870 MB
Please specify size of free space after the partition: 2782 0 MB - 122,870 MB
Please select file system for new partition: NTFS
Please enter new volume label: New Volume
Please specify drive letter: H:
More options
Yes
No

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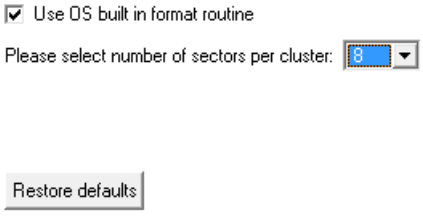
- **Define whether the partition will be Primary, Extended or Logical**. You can choose the desired partition type from the pull-down list. As a matter of fact, the available alternatives fundamentally depend on the selected block of free space - within the Logical free space, only Logical partitions can be created; Within the Primary free space, both Primary partitions or the Extended Partition can be created.
- **Partition Size**. Define the size (in Mb) of the new partition.
- **Free space before**. Define the position (in Mb) of the new partition relative to the beginning of the block of free space.
- **Free space after**. Define the amount of trailing free space (in Mb) at the end of the new partition.

Partition size and position may also be defined by using the drag-and-drop technique. To do that, just carry out the required operation on the Disk Map. The virtual operations are to be available.

- **File system for new partition**. From the pull-down list select a file system the newly created partition will be formatted to, otherwise the partition will remain unformatted (so that it will not be ready to use).
- **Volume label**. Enter a label for the selected partition in this textual field. It is an irrelevant parameter usually used for drive identification.
- **Drive letter assignment**. The pull-down list contains vacant drive letters that can be associated with the newly formatted partition.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, you need to click the More options button at the foot of the dialog page. Depending on the chosen file system, the following options become available:



- **Use OS built-in routine**. Mark the option to restrict the available values according to the used OS.
- **The amount of sectors per cluster**. Define the Cluster Size for the formatted partition with this spinner control.

Number of available options depends on the selected file system type.

Result

After the operation is completed you receive a fully functional partition.

Available operation scenarios:

- Creating a new partition to detach operating system from the rest of data

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Formatting Partitions

Any partition should contain some file system to be used for keeping data. The process of installing a file system is commonly known as formatting. A huge variety of file systems have been developed these days.

Supported File Systems

The program provides the ability to format partitions of the following file systems:

- FAT12 & FAT16
- FAT32
- HFS+
- NTFS
- Ext2
- Ext3
- Ext4
- Linux Swap v. 2

Wizard Startup

- Click the **Partitioning** tab on the Ribbon Panel, then select **Format Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Dialog Startup

1. Select a partition on the Disk Map;
2. Call a context menu for the selected object by the right mouse click, then select **Format Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Wizard Setup

The wizard offers the following steps to accomplish the operation:

- **Partition to format**. Select a hard disk (if the computer has several hard disks) and then the required partition to format.

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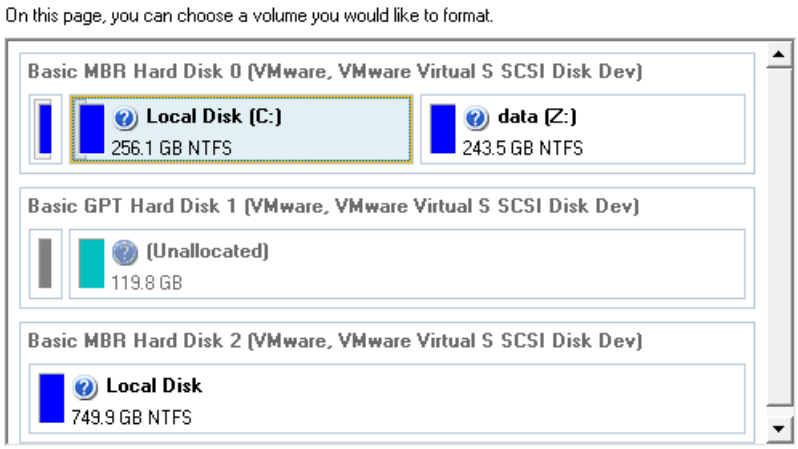
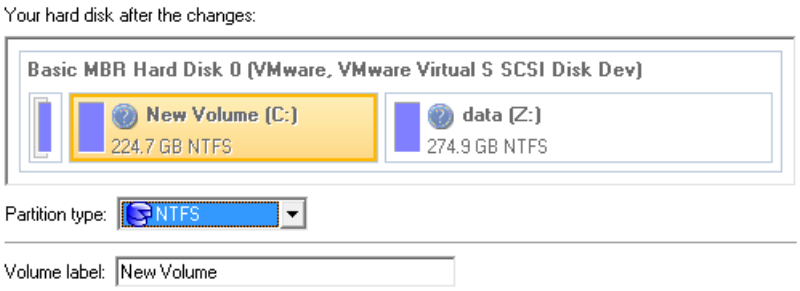

On this page, you can choose a volume you would like to format.
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
256.1 GB NTFS
data (Z:)
243.5 GB NTFS
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
119.8 GB
Basic MBR Hard Disk 2 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk
749.9 GB NTFS

As a result of this operation contents of the selected partition will be lost.

- **Partition properties**. On the next page of the wizard you can set the following partition parameters:

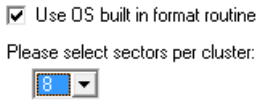


- **Partition type**. From the pull-down list select the desired file system type. In fact, the program displays only those file systems that can correctly be placed to the selected partition, taking its capacity into account.

- **Volume label**. Enter a label for the selected partition in this textual field. It is an irrelevant parameter usually used for drive identification.

- **Drive letter assignment**. The pull-down list contains vacant drive letters that can be associated with the newly formatted partition.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, you need to mark the appropriate option at the foot of the page. When it is marked, the next page enables to define:



- **Use OS built-in routine**. Mark the checkbox to restrict the available values according to the used OS.

- **The amount of sectors per cluster**. Define the Cluster Size for the formatted partition with this spinner control.

Number of available options depends on the selected file system type.

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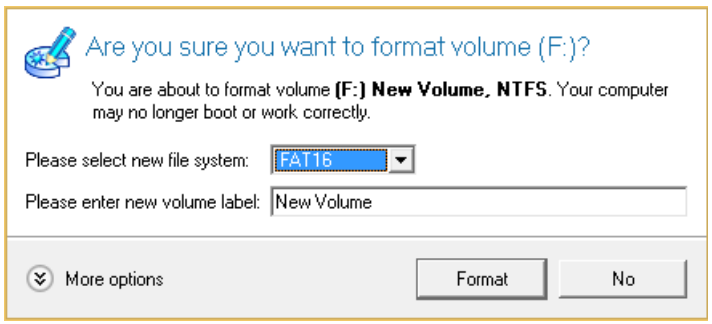
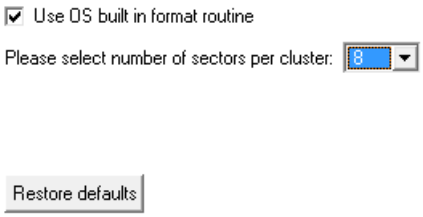
Dialog Setup

Initially the program suggests some consistent values for all parameters. In most cases, you can just press the Format button to confirm the operation.


Are you sure you want to format volume (F:)?
You are about to format volume (F:) New Volume, NTFS. Your computer may no longer boot or work correctly.
Please select new file system:
FAT16
Please enter new volume label:
New Volume
More options
Format
No

- **File system**. From the pull-down list select the desired file system type. In fact, the program displays only those file systems that can correctly be placed to the selected partition, taking its capacity into account.
- **Volume label**. Enter a label for the selected partition in this textual field. It is an irrelevant parameter usually used for drive identification.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, you need to click the More options button at the foot of the dialog page. Depending on the chosen file system, the following options become available:



- **Use OS built-in routine**. Mark the checkbox to restrict the available values according to the used OS.
- **The amount of sectors per cluster**. Define the Cluster Size for the formatted partition with this spinner control.

Number of available options depends on the selected file system type.

Result

After the operation is completed you receive a fully functional partition formatted to the specified file system.

Deleting Partitions

Wizard Startup

- Click the **Partitioning** tab on the Ribbon Panel, then select **Delete Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

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Dialog Startup

In order to start the operation you should take the following steps:

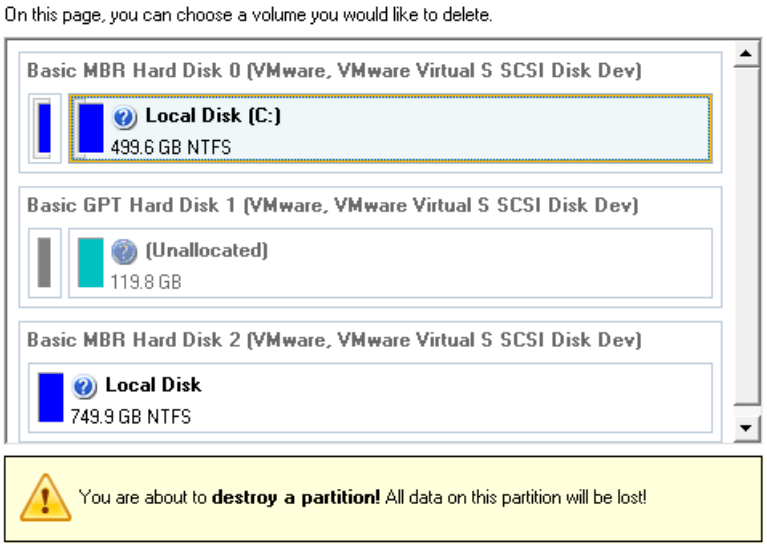
1. Select a partition on the Disk Map;
2. Call a context menu for the selected object by the right mouse click, then select Create **Delete Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Wizard Setup

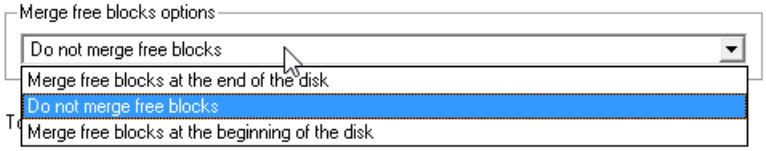
The wizard offers the following steps to accomplish the operation:

- **Partition to delete**. Select a hard disk (if the computer has several hard disks) and then the required partition to delete.


On this page, you can choose a volume you would like to delete.
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
499.6 GB NTFS
Basic GPT Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
119.8 GB
Basic MBR Hard Disk 2 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk
749.9 GB NTFS
You are about to destroy a partition! All data on this partition will be lost!

As a result of this operation contents of the selected partition will be lost.

- **Merge free blocks**. As a result of the operation you may get several blocks of the unallocated space on the hard disk. So choose whether to merge them all and place at the beginning of the disk or at the end by selecting the required operation from the pull-down list.


Merge free blocks options
Do not merge free blocks
Merge free blocks at the end of the disk
Do not merge free blocks
Merge free blocks at the beginning of the disk

Dialog Setup

Initially the program suggests you just to remove references to the selected partition from the Partition Table.

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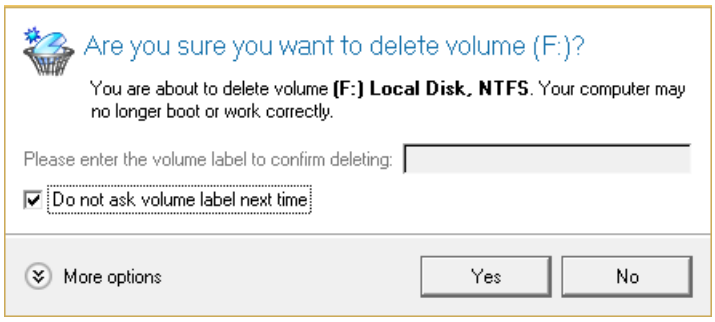

Are you sure you want to delete volume (F:)?
You are about to delete volume (F:) Local Disk, NTFS. Your computer may no longer boot or work correctly.
Please enter the volume label to confirm deleting:
Do not ask volume label next time
More options
Yes
No

- **Enter the volume label to confirm deleting**. To confirm deletion of the selected partition, enter its Volume Label. The current volume label is displayed above.
- **Do not ask volume label next time**. Mark the option to inhibit confirmation next time you start the dialog.

Result

By default, the operation takes only a fraction of a second. However, the program waits until Windows completes the modification of the disk layout.

Hard Disk Management

In this chapter you will find all the information necessary to carry hard disk operations supported by the program.

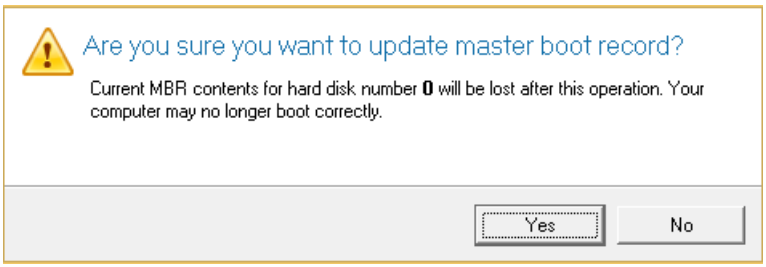
Updating MBR

The program enables to overwrite the current bootable code in the MBR (Master Boot Record) by the standard bootstrap code. This can help to repair a corrupted bootable code of a hard disk resulted from a boot virus attack or a malfunction of boot management software.

In order to update MBR of a hard disk you should take the following steps:

1. Select a hard disk on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Update MBR**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.


Are you sure you want to update master boot record?
Current MBR contents for hard disk number 0 will be lost after this operation. Your computer may no longer boot correctly.
Yes
No

3. The operation will be performed immediately after confirmation.

Wipe Tasks

In this chapter you will find all the information necessary to wipe a hard disk/partition of any file system or only destroy any remnants of deleted files/directories left on disk without affecting the used data, thus providing high level of security.

The operation can be accomplished with the Wipe Wizard or corresponding dialogs.

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Wizard Startup

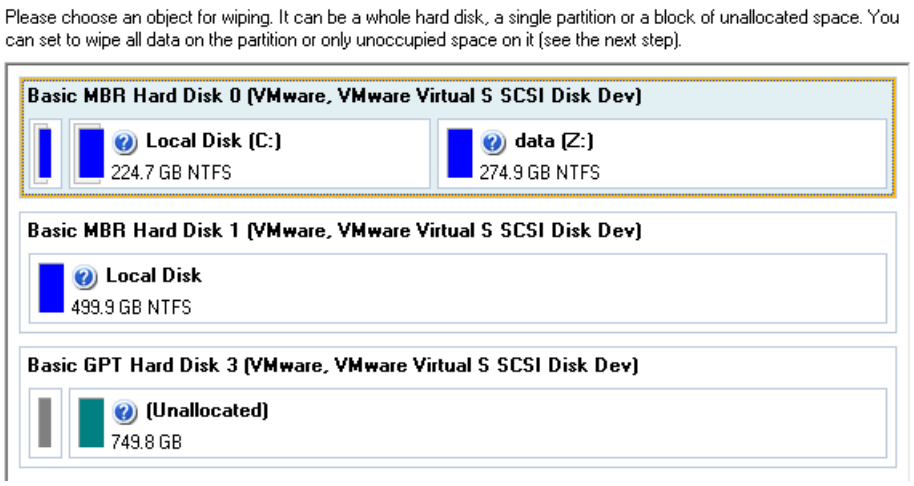
- Click the **Partitioning** tab on the Ribbon Panel, then select **Wipe Disk or Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

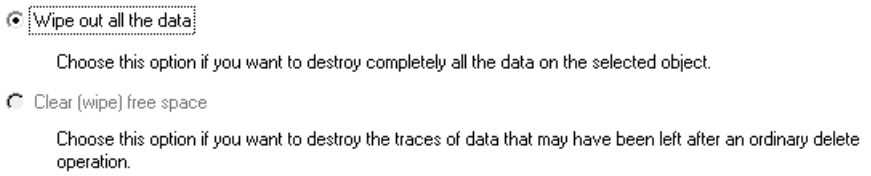
Wizard Setup

The wizard offers the following steps to accomplish the operation:

- **The hard disk/partition to wipe**. Select a hard disk/partition the data of which you want to destroy.


Please choose an object for wiping. It can be a whole hard disk, a single partition or a block of unallocated space. You can set to wipe all data on the partition or only unoccupied space on it (see the next step).
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
224.7 GB NTFS
data (Z:)
274.9 GB NTFS
Basic MBR Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk
499.9 GB NTFS
Basic GPT Hard Disk 3 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
749.8 GB

- **Wipe mode**. This section enables to switch between two options:


Wipe out all the data
Choose this option if you want to destroy completely all the data on the selected object.
Clear (wipe) free space
Choose this option if you want to destroy the traces of data that may have been left after an ordinary delete operation.

- **Wipe out all data**. Select the option to irreversibly destroy all on-disk data of the selected object.

- **Clear (wipe) free space**. Select the option to destroy any remnants of deleted files/directories left on disk without affecting the used data.

The Clear Free Space operation is available only for Logical and Primary partitions of known file systems.

- **Wipe method**. Here you can select a specific data erasure algorithm, create a customized method, or if you're going to wipe SSD, use the SSD Trim option to irreversibly destroy data on this type of storage device.

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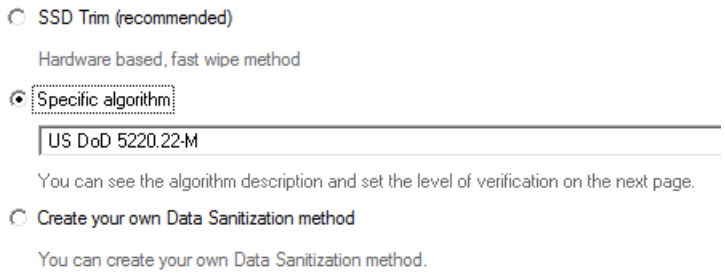
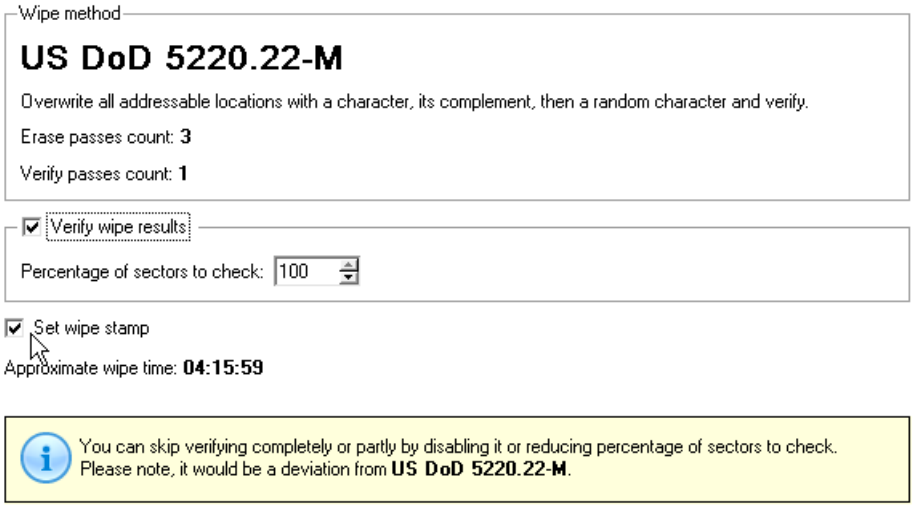
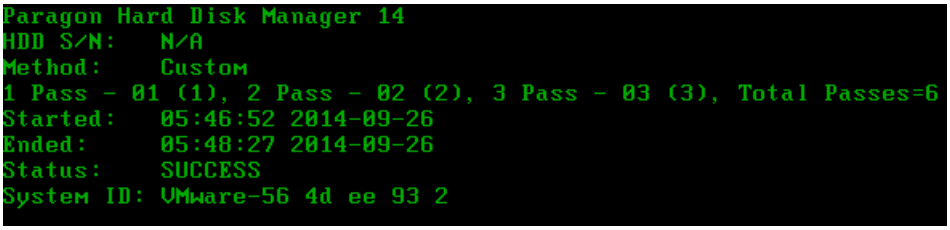

SSD Trim (recommended)
Hardware based, fast wipe method
Specific algorithm
US DoD 5220.22-M
You can see the algorithm description and set the level of verification on the next page.
Create your own Data Sanitization method
You can create your own Data Sanitization method.

- In case you preferred to use a specific algorithm, the next page of the wizard enables to get detailed information on the selected algorithm, choose whether to carry out residual data verification or not specifying the percentage of sectors to check and estimate the time required to accomplish the operation.


Wipe method
US DoD 5220.22-M
Overwrite all addressable locations with a character, its complement, then a random character and verify.
Erase passes count: 3
Verify passes count: 1
Verify wipe results
Percentage of sectors to check: 100
Set wipe stamp
Approximate wipe time: 04:15:59
You can skip verifying completely or partly by disabling it or reducing percentage of sectors to check.
Please note, it would be a deviation from US DoD 5220.22-M.

By marking the **Set wipe stamp** checkbox you make the wizard add to the MBR of the wiped storage device information on the used wipe program, algorithm, device serial number, wipe status, system ID (obtained through WMI), etc. Thus when attempting to boot from this storage, you'll be notified how and when this storage has been wiped. Please note this option is only available for wiping of entire disks.


Paragon Hard Disk Manager 14
HDD S/N: N/A
Method: Custom
1 Pass - 01 (1), 2 Pass - 02 (2), 3 Pass - 03 (3), Total Passes=6
Started: 05:46:52 2014-09-26
Ended: 05:48:27 2014-09-26
Status: SUCCESS
System ID: VMware-56 4d ee 93 2

The list of supported military and government standards may vary for your product.

- In case you preferred to create a customized algorithm, the next page of the wizard enables to define up to 4 wiping patterns, number of passes for each wiping pattern and for the group of patterns. The Mask spinner control allows you to set a two-figure hexadecimal character value ("00" by default). The available range is from "00" to "FF". You can also choose whether to carry out residual data verification or not specifying the percentage of sectors to check.

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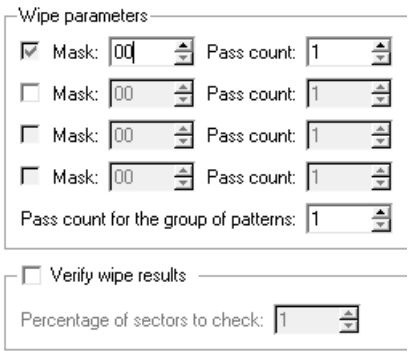
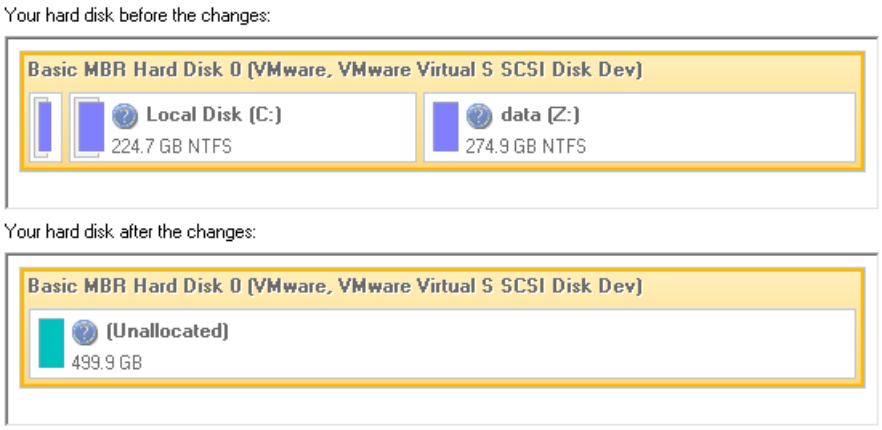
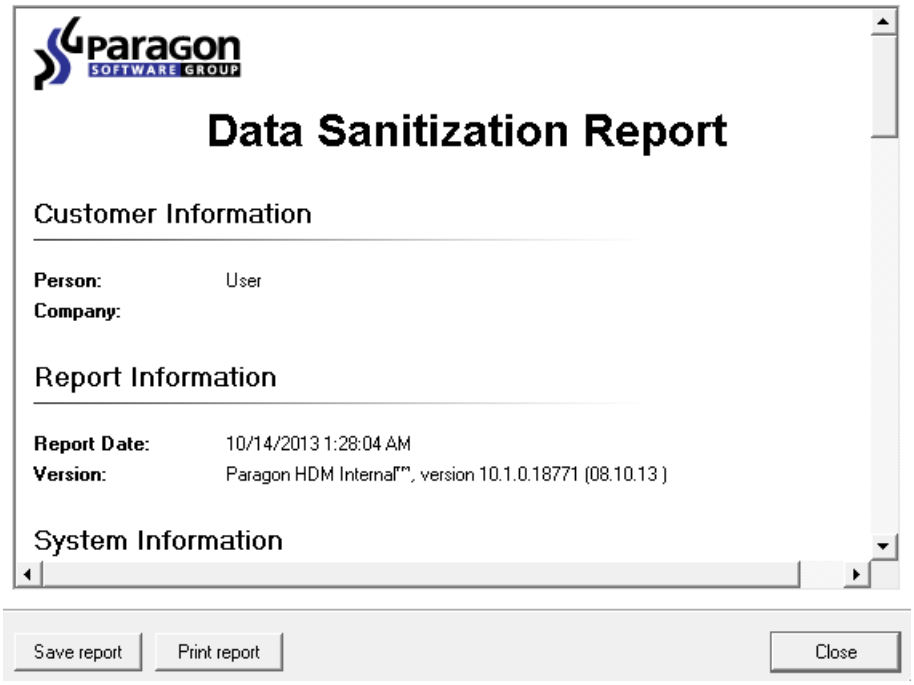

Wipe parameters
Mask: 00 Pass count: 1
Mask: 00 Pass count: 1
Mask: 00 Pass count: 1
Mask: 00 Pass count: 1
Pass count for the group of patterns: 1
Verify wipe results
Percentage of sectors to check: 1

Revise your changes. This page informs on all the actions to be made in the wizard in a bright, graphical form.


Your hard disk before the changes:
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
224.7 GB NTFS
data (Z:)
274.9 GB NTFS
Your hard disk after the changes:
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
499.9 GB

Wizard Result

After the operation is completed you can see a well informative summary page, providing structurally divided in-depth information on all the actions made in the wizard.



The program also enables to store the resulted report. To do that, just press the Save button and choose the exact location in the opened dialog.

To make sure that all on-disk data is irreversibly destroyed call the Disk Viewer dialog by clicking the appropriate tab and see it for yourself.

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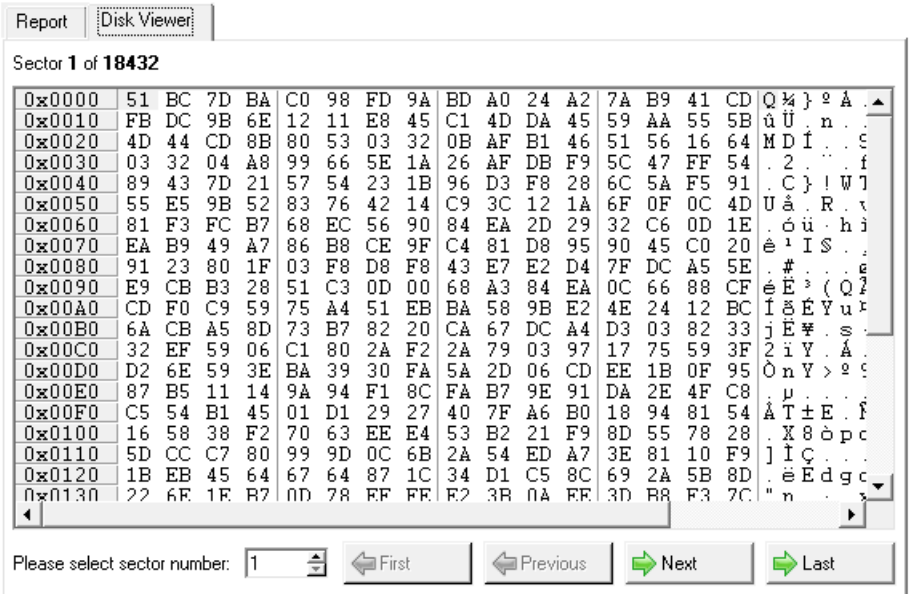


The Summary page will be available only when the Virtual operations are disabled.

Available operation scenarios:

- Hard Disk Utilization

Task Scheduling

Automation of operations can really help you out when you've got to accomplish certain routine operations on a regular basis as it enables to execute them without your involvement while optimizing your computer's work-load.

Setting a Timetable

Thanks to the embedded Scheduler, you can set a timetable for execution of any operation. It has two categories for time settings (these correspond to appropriate items in the Schedule type menu):

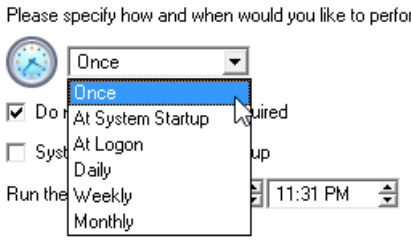
- **Initiating the operation by an event**:

  - One time only (i.e. the Once item)

  - When the system starts (i.e. the At System Startup item)

  - When the user logs on (i.e. the At Logon item).

- **Initiating the operation periodically (i.e. Daily, Weekly, Monthly)**.



You need to select one of the variants. Depending on your choice, the scheduler displays a form that enables to set a timetable.

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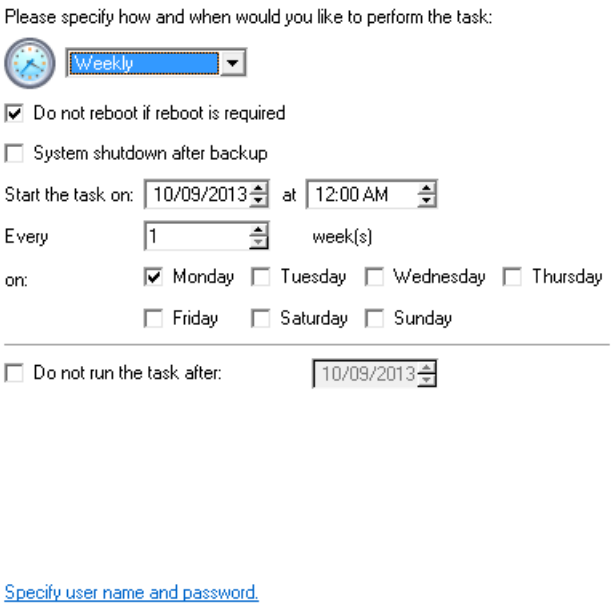
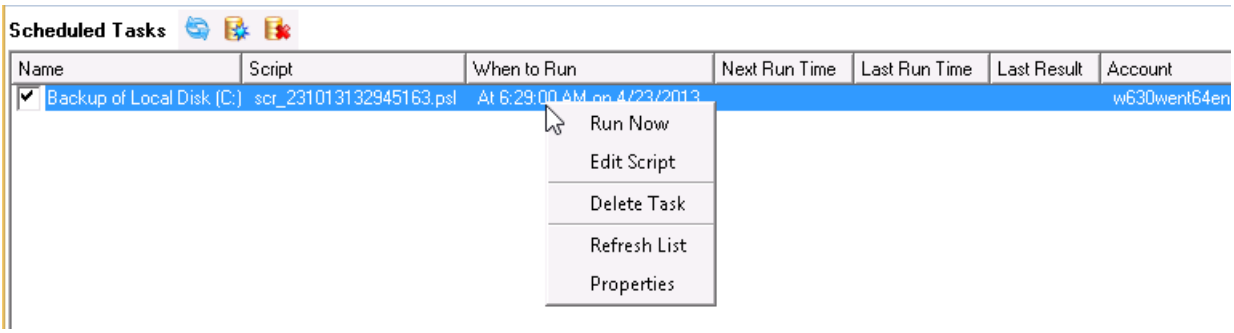

Please specify how and when would you like to perform the task:
Weekly
Do not reboot if reboot is required
System shutdown after backup
Start the task on: 10/09/2013 at 12:00 AM
Every 1 week(s)
on: Monday Tuesday Wednesday Thursday
Friday Saturday Sunday
Do not run the task after: 10/09/2013
Specify user name and password.

To run the task in the log-off mode, please specify administering login info by following the appropriate link in the left lower corner of the page.

The Shutdown System on Complete option enables to automatically switch off the computer on the successful accomplishment of the operation.

Managing Tasks

All scheduled tasks are placed in a separate list, which can be retrieved by clicking the Schedule tab on the Ribbon Panel:



On every task you can get in-depth information, including:

- The task name
- The full path to the generated script of the task
- Scheduled time of launch
- Statistics on the last launch
- Scheduled time of the next launch
- Used account information
- Comments to the task

To easily manage tasks, the program enables to arrange them according to a certain characteristic just by clicking on the required property.

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This feature can be particularly beneficial when the Scheduled Tasks list contains too many items.

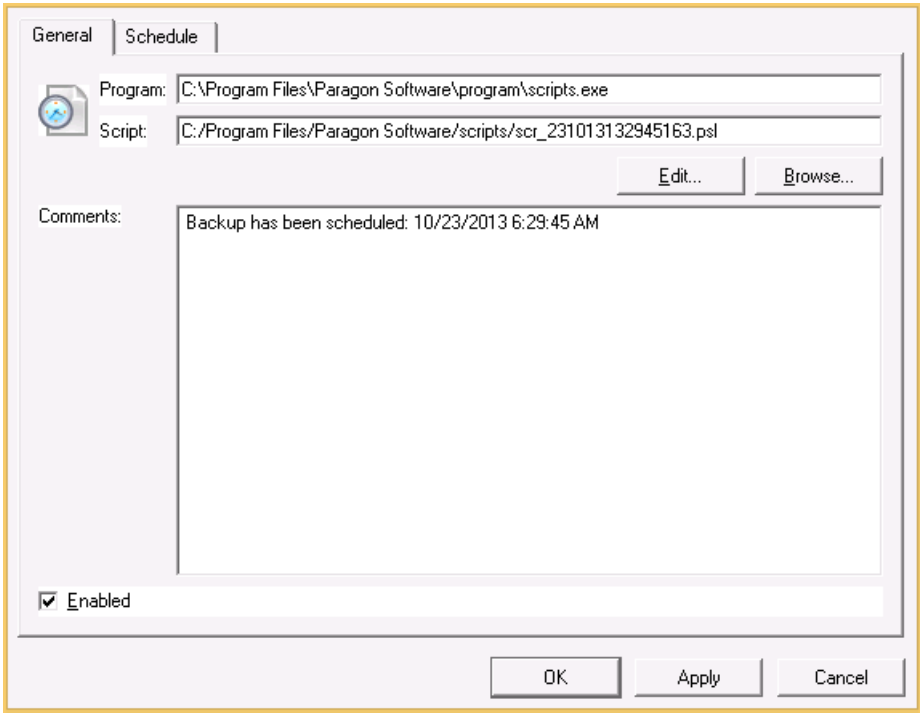
You can also enable/disable, rename, delete, refresh or modify properties of the selected task.

Task Editor

With the Task Editor you can easily modify properties of scheduled tasks. To do that, you should take the following steps:

1. Select a task on the Scheduled Tasks list.
2. Click the **Properties** button on the Scheduled Tasks list.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.



3. In the opened dialog window you can see two tabs - General and Schedule. Click the General tab to modify:
   - Full path to the macro-command program-interpreter, which describes the scheduled task;
   - Command line for starting the interpreter (i.e. the task described in macro-language)
   - Comments referring to the task
   - The option of enabling/disabling the task.

   By clicking the Schedule tab you can modify the task timetable.

In order to apply the changes, you need to click the Apply button at the foot of the dialog.

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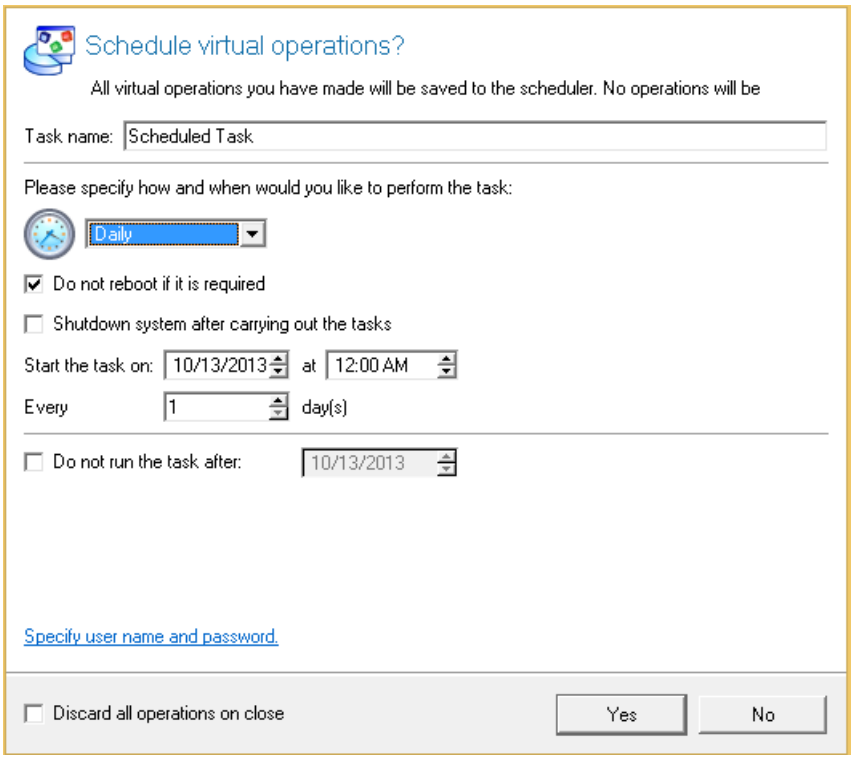
Creating a Scheduled Task

You can set a timetable for execution of any operation. For backup and copy operations the program offers handy wizards, while all the others can be scheduled with the Save to Scheduler dialog.

To create a scheduled task you should take the following steps:

1. Make sure the virtual mode of execution is enabled;
2. Carry out with the program all operations you need to schedule;
3. Call the Save to Scheduler dialog by clicking its icon on the Virtual Operations Bar;


Schedule virtual operations?
All virtual operations you have made will be saved to the scheduler. No operations will be
Task name: Scheduled Task
Please specify how and when would you like to perform the task:
Daily
Do not reboot if it is required
Shutdown system after carrying out the tasks
Start the task on: 10/13/2013 at 12:00 AM
Every 1 day(s)
Do not run the task after: 10/13/2013
Specify user name and password.
Discard all operations on close
Yes
No

4. In the opened dialog enter the required task name and specify the task timetable;
5. The operation will be performed immediately after confirmation.

This command is unavailable if there are no operations on the List of Pending Operations.

Scripting

The program actions can also be represented in form of a script. The script describes the appropriate operation with macro-language commands. There is an interpreter utility - SCRIPTS.exe, which is included in the program installation package. This utility works in the unattended mode, which enables to automate operations.

Startup

You have no need to write a script since the program has a convenient interface for such a task. In order to generate a script on the base of the entered parameters of the required operation, you should take the following steps:

1. Make sure the virtual mode of execution is enabled;
2. Carry out with the program all operations you need to be scripted;
3. Call the Generate Script dialog by clicking its icon on the Virtual Operations Bar.

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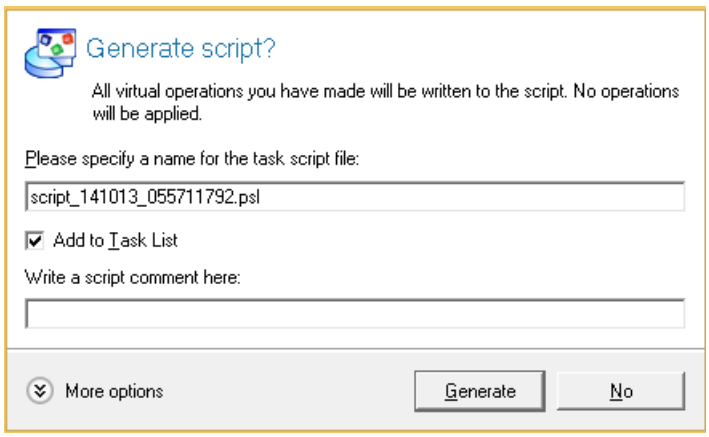
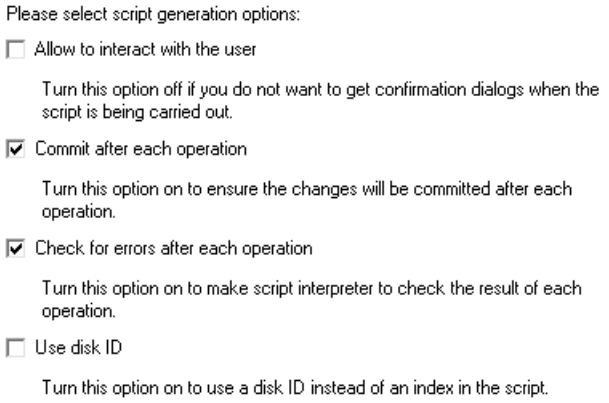
Setup

Initially the program suggests some consistent values for all parameters. In most cases, you can just press the Generate button to confirm the operation.


Generate script?
All virtual operations you have made will be written to the script. No operations will be applied.
Please specify a name for the task script file:
script_141013_055711792.psl
Add to Task List
Write a script comment here:
More options
Generate
No

- **Script file name and location**. By default, the program offers to add the script to the Task List with a name containing its creation date and time. Unmark the Add to Task List checkbox to define an exact location and a filename for the script file. The default file extension that is reserved for scripting files is .psl, which however can be modified.
- **Add to Task List**. By default, the script will be automatically added to corresponding list. If necessary, add a small comment to it.

In addition, there is the possibility to make further detailed settings (although the default values will do in most cases). To activate the advance mode, you need to click the More options button at the foot of the dialog page, so you will be able to define:


Please select script generation options:
Allow to interact with the user
Turn this option off if you do not want to get confirmation dialogs when the script is being carried out.
Commit after each operation
Turn this option on to ensure the changes will be committed after each operation.
Check for errors after each operation
Turn this option on to make script interpreter to check the result of each operation.
Use disk ID
Turn this option on to use a disk ID instead of an index in the script.

- **Interaction with the user**. Mark the option to pause the script interpreter during the execution to prompt the user's confirmation or other input. Otherwise the program will not stop using default values for parameters if needed.
- **Commit after each operation**. Mark the option to commit changes after each operation.
- **Check for errors after each operation**. Mark the option to insert a special code in script, which checks the status of the last executed operation and stops the script processing if there are errors of any kind.
- **Discard all operations on close**. Mark the option to empty the List of Pending Operations after generating the script.

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Result

After the operation is completed you receive a new script file. It is placed into the specified destination, its features defined in the dialog.

This command is unavailable if there are no operations on the List of Pending Operations.

To learn more about scripts please consult the Paragon Scripting Language manual.

Extra Functionality

This chapter describes the supplementary functionality available in the program.

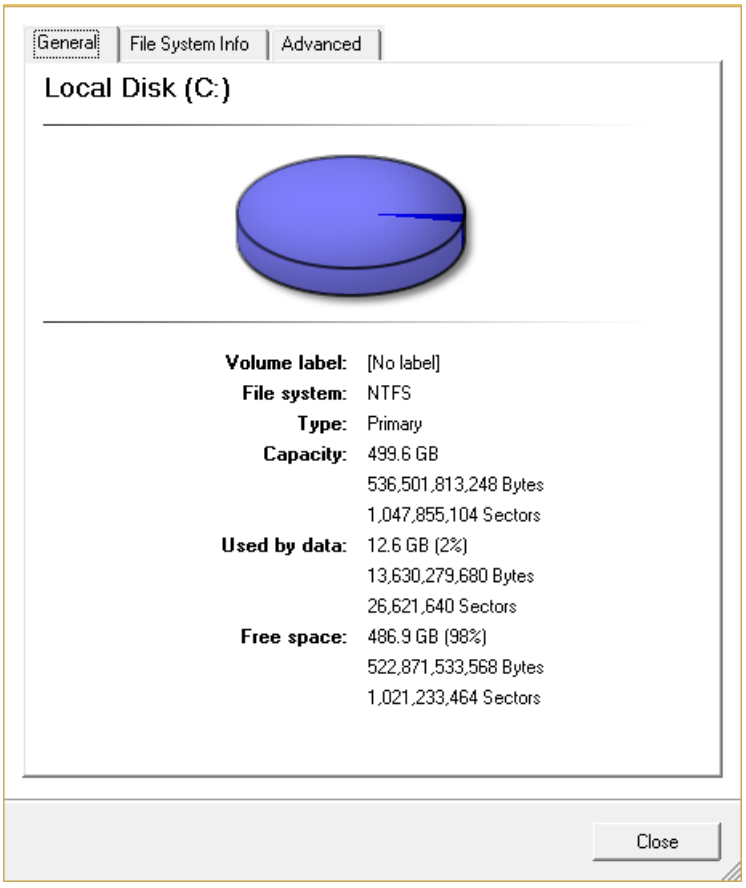
View Partition/Hard Disk Properties

The program enables to obtain in-depth information on the properties of hard disks and partitions. Besides the general information, such as capacity, used space or file system type it provides the possibility to get info on hard disk geometry, cluster size, exact partition location, etc.

To get properties on a partition/hard disk, please do the following:

1. Choose a partition/hard disk on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Properties…**

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.



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In the opened dialog information will be grouped according to its properties, thus by clicking tabs you can get information you need.

File Transfer Wizard

File Transfer Wizard is designed to make such operations as copying of separate files/directories or burning of them to CD/DVD as easy and convenient as possible. It may be of particular use in case of a system malfunction, caused either by a virus attack or files corruption, in order to get the system back on track again. Besides it provides access to Paragon backups as regular folders to browse through their contents or copy required files.

Startup

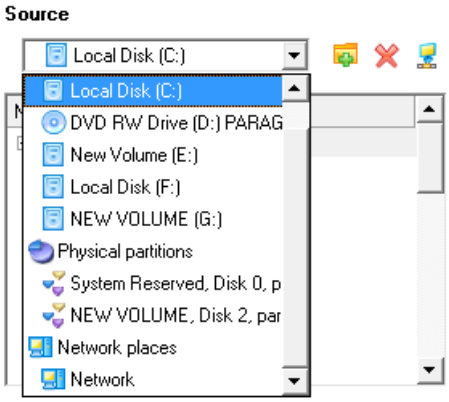
- Click **Tool Button**, then select **File Transfer Wizard**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Setup

The wizard offers the following steps to accomplish the transfer operation:

- **Place to look for files/directories**. Select a source disk from the pull-down list in the left pane of the page. The program enables to process both mounted and unmounted (without drive letter assigned) partitions. Besides it is possible to map a network drive.



- **Object(s) of operation**. Choose files/directories you want to copy and place them to Clipboard by pressing the Add button. To delete a file/directory from the Clipboard, select it in the Clipboard pane and press the Remove button. You can also create a new folder, rename or irreversibly delete existing files/directories of the left pane by pressing the appropriate buttons.

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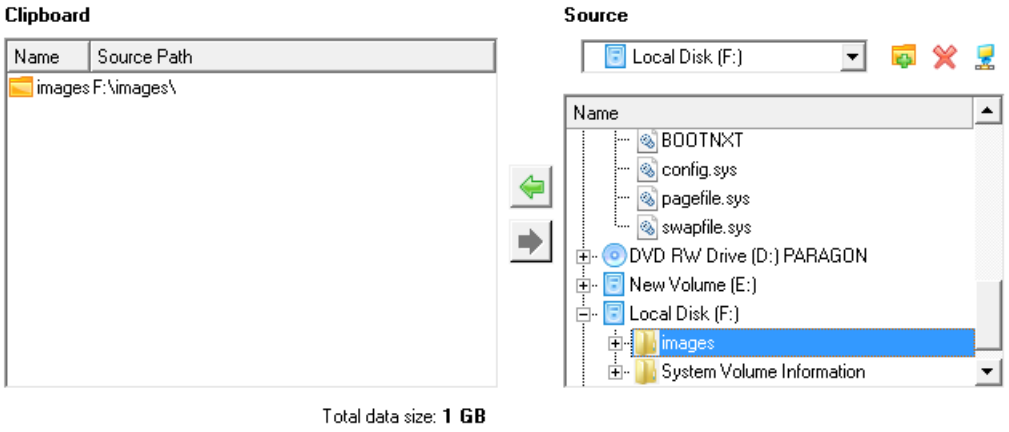
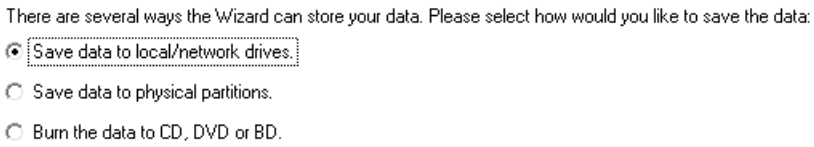
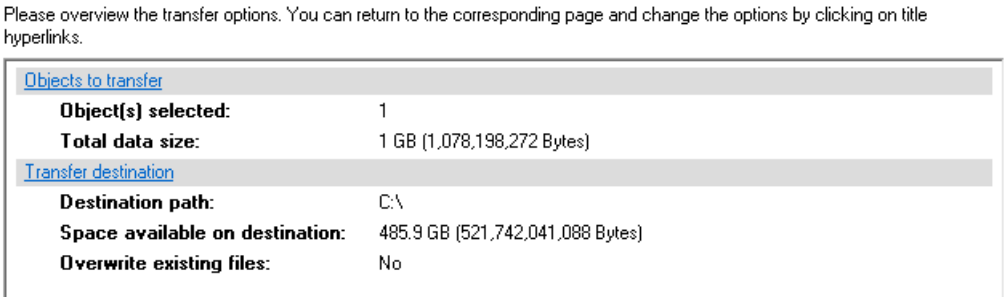


Files/directories deleted from the Clipboard remain intact on source disks.

- **Destination to store the object(s)**. The File Transfer Wizard allows copying data to local or network drives, to physical partitions (without drive letters assigned), or burning them to CD/DVDs. Choose the way the data will be stored.


There are several ways the Wizard can store your data. Please select how would you like to save the data:
Save data to local/network drives.
Save data to physical partitions.
Burn the data to CD, DVD or BD.

- **Revision of changes**. The Transfer Summary page provides structurally divided information on all the actions made in the wizard. Check the changes and come back to any step of the wizard (if necessary) by following the required hyperlink.


Please overview the transfer options. You can return to the corresponding page and change the options by clicking on title hyperlinks.
Objects to transfer
Object(s) selected: 1
Total data size: 1 GB (1,078,198,272 Bytes)
Transfer destination
Destination path: C:\
Space available on destination: 485.9 GB (521,742,041,088 Bytes)
Overwrite existing files: No

Result

After the operation is completed the required data will be placed into the specified destination.

Available operation scenarios:

- Copying of data from the corrupted system disk to another hard disk
- Burning of data from the corrupted system disk to CD/DVD
- Copying of data from a backup to the corrupted system partition
- Restoring separate files and folders from a backup

Mount Partition

The program enables to assign or remove drive letters of existing formatted partitions.

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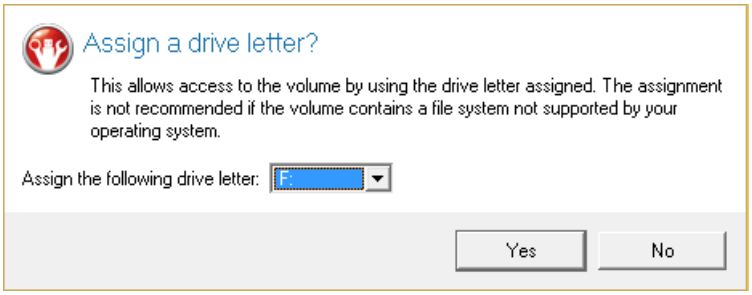
Assign Drive Letter

In order to mount a partition you should take the following steps:

1. Select a partition on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Assign Drive Letter…**

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

3. Specify a drive letter for the selected partition. Initially the program suggests some consistent value for this parameter. So you may just press the Yes button to confirm the operation.


Assign a drive letter?
This allows access to the volume by using the drive letter assigned. The assignment is not recommended if the volume contains a file system not supported by your operating system.
Assign the following drive letter:
F:
Yes
No

However you can manually define the required letter by selecting it from the pull-down list of available drive letters.

4. The operation will be performed immediately after confirmation.

Remove Drive Letter

In order to un-mount a partition you should take the following steps:

1. Select a partition on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Remove Drive Letter**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

3. The operation will be performed immediately after confirmation.

Modifying drive letter of the system partition will result in inability to boot the operating system.

After having processed partitions with installed software, some programs may not run properly.

Test Surface

The program enables to test surface of existing partitions and blocks of free space for bad or unstable sectors. If found any it automatically marks them unusable in the file system metadata, thus minimizing the risk of data loss.

In order to start the surface test you should take the following steps:

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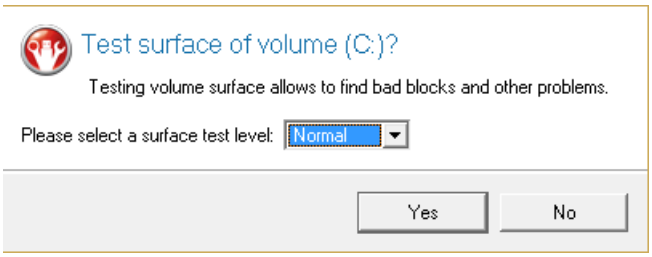
1. Select a partition or a block of free space on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Test Surface…**

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

3. From the pull-down list choose the level of the surface check.


Test surface of volume (C:)?
Testing volume surface allows to find bad blocks and other problems.
Please select a surface test level:
Normal
Yes
No

4. The operation will be performed immediately after confirmation.

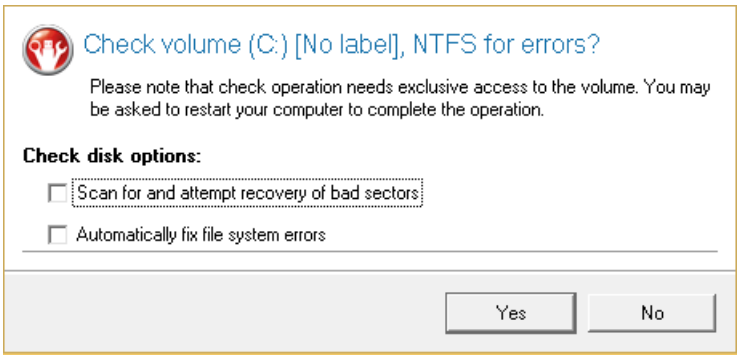
Check File System Integrity

The program allows you to check integrity of a file system. It can be used to detect possible file system errors before performing any operation on a partition.

To start the system integrity check you should take the following steps:

1. Select a partition on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Check File System Integrity**

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.


Check volume (C:) [No label], NTFS for errors?
Please note that check operation needs exclusive access to the volume. You may be asked to restart your computer to complete the operation.
Check disk options:
Scan for and attempt recovery of bad sectors
Automatically fix file system errors
Yes
No

3. The operation will be performed immediately after confirmation.

Check Recovery Discs

You've got the ability to check whether backup media created with the program is 100 percent error-free and ready to use. The Check Recovery Disc Wizard will help you do that.

This function is not available for a 32-bit version of the program.

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Startup

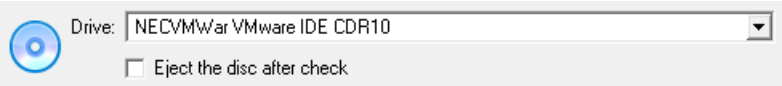
- Click **Tool Button**, then select **Check Recovery Discs…**

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

Startup

The wizard offers the following steps to accomplish the operation:

- **CD/DVD drive**. Select from the pull-down list of available CD/DVD devices the required drive to use during the operation.



- Set whether to eject the disk after the operation is completed or not.

Result

After the operation is completed you can see results of the check.

Edit/View Sectors

With the built-in Edit/View Sectors tool the program enables to view/edit sectors on existing partitions/hard disks providing the possibility to directly access and modify sectors, save and restore sectors from specified files, navigate through the system metadata, etc.

In order to edit/view sectors of a hard disk/partition you should take the following steps:

1. Select a hard disk/partition on the Disk Map.
2. Call a context menu for the selected object by the right mouse click, then select **Edit/View Sectors**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

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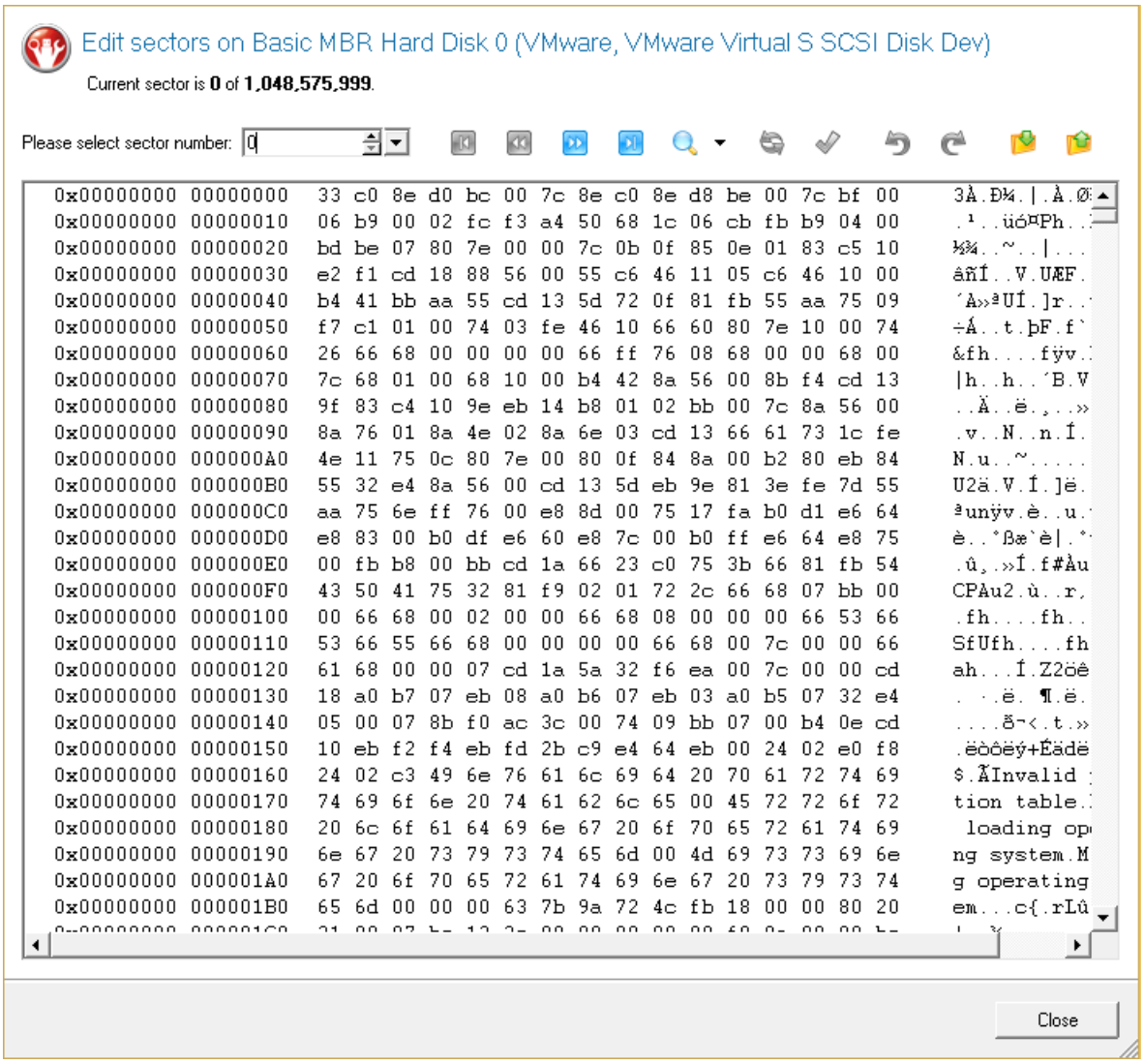

Careless use of the Edit Sectors function may result in the irreversible data corruption.

Send Log Files

The program enables to simplify the procedure of sending support requests to the Paragon Support Team. In case of having difficulties with handling the program, you, with the help of this very function, can address the company support engineers and provide them with all the information they need such as the disk layout, performed operations, etc. in order to tackle the encountered problem. Information of that kind is stored in Log files.

In order to send log files to the Paragon Support Team you should take the following steps:

1. Click **Tool Button**, then select **Send Log Files**;
2. Provide a customer name and a product serial number;
3. Give a detailed description on the encountered problem.

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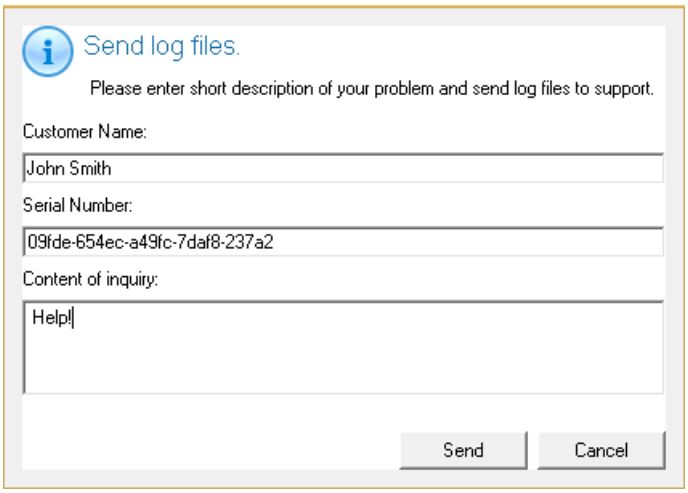

By clicking the Send button the built-in mail client will generate a template request with attached compressed log files and then send it to the Paragon Support Team.

Log files do not contain any confidential information on the operating system settings or the user documents.

The Send Log Files function is only available when outgoing mail server (SMTP) and the user e-mail address are properly set. To learn more about it please consult the Settings Overview chapter.

View Logs

With a handy dialog you can study logs on any operation carried by the program. To make this job as easy as possible, all the information is structurally divided, besides there is the possibility to see the disk layout before and after an operation, what is very convenient.

In order to view logs on carried out operations, click **Tool Button**, then select **View Log Files**.

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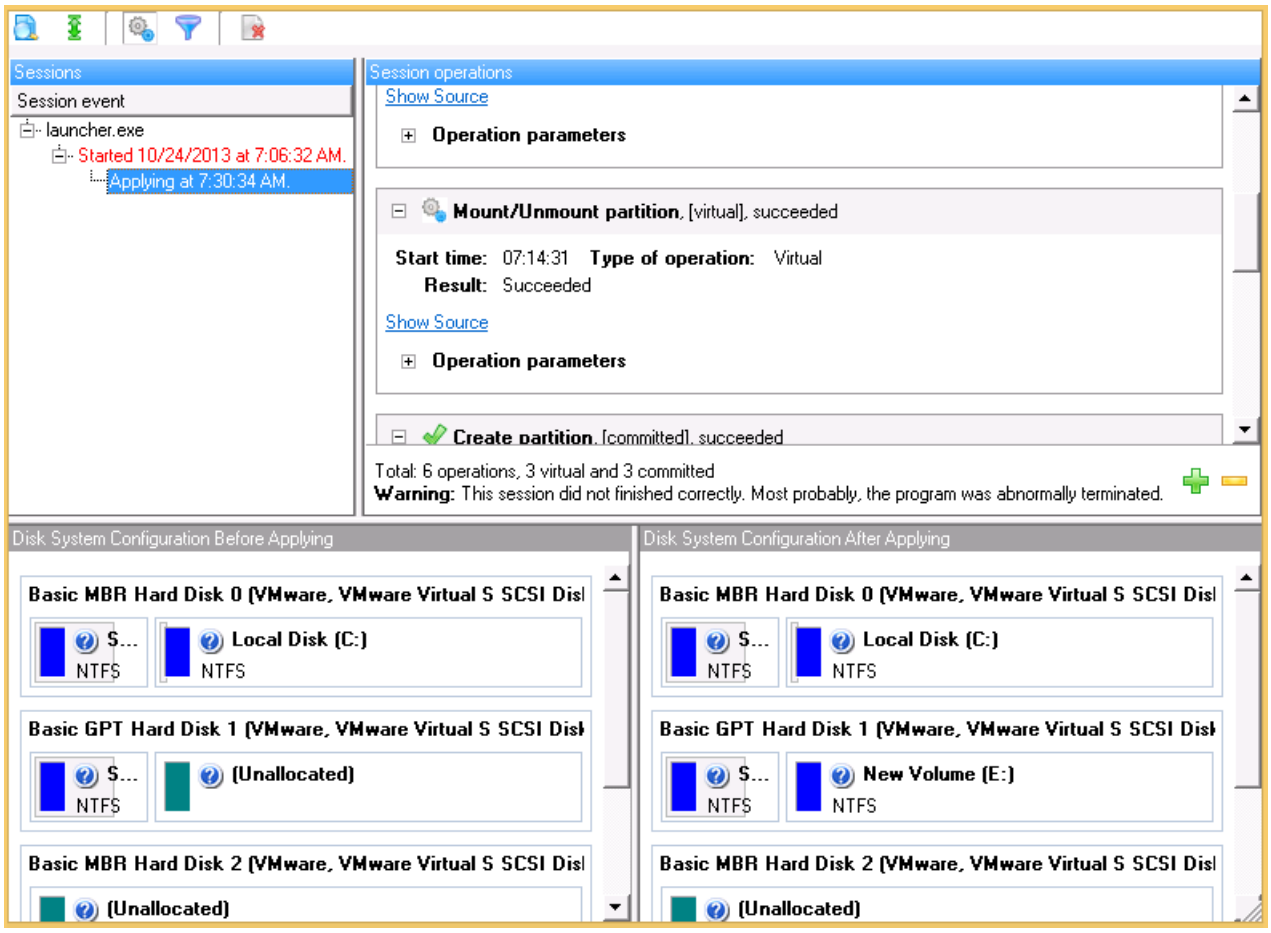

Typical Scenarios

This chapter lists a number of the most frequently used scenarios that may be accomplished with the program. You can find here useful recommendations and descriptions of operations.

Hard Disk Utilization

To irreversibly destroy all on-disk information without any possibility to recover and that way providing the maximum level of security, please do the following:

1. Click the **Partitioning** tab on the Ribbon Panel, then select **Wipe Disk or Partition**.

There are other ways to start up this function, please consult the Interface Overview chapter to know more on the subject.

2. On the Wizard's Welcome page, click the Next button.
3. Select a hard disk, the data of which you want to wipe out.

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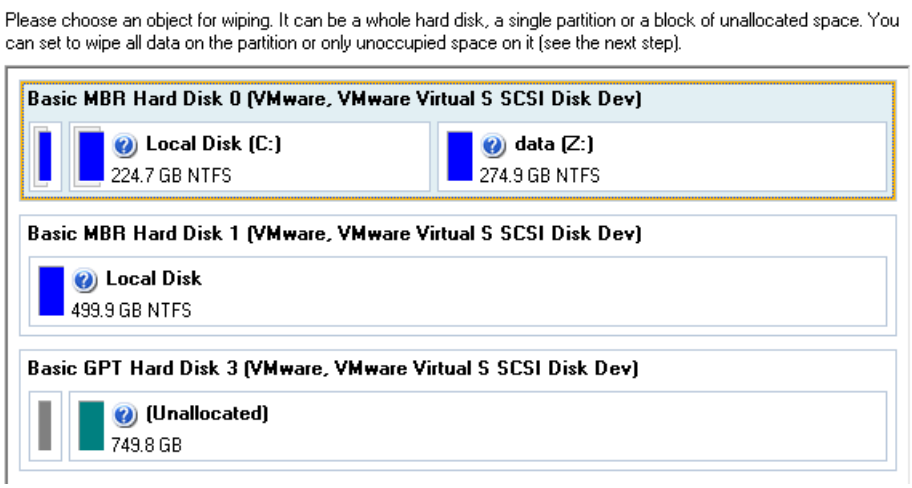
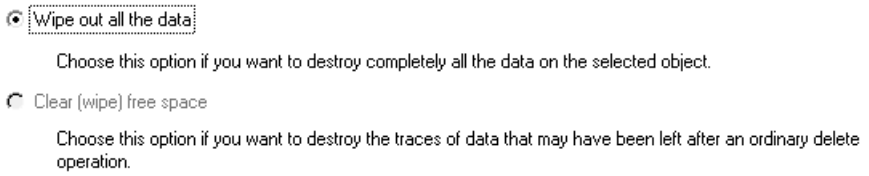
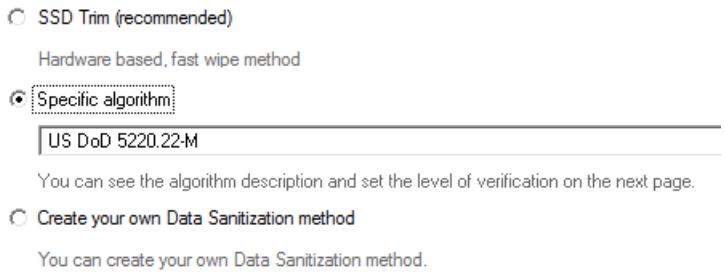

Please choose an object for wiping. It can be a whole hard disk, a single partition or a block of unallocated space. You can set to wipe all data on the partition or only unoccupied space on it (see the next step).
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
224.7 GB NTFS
data (Z:)
274.9 GB NTFS
Basic MBR Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk
499.9 GB NTFS
Basic GPT Hard Disk 3 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
749.8 GB

4. On the Wipe Mode page, select the wipe out all the data to irreversible destroy all on-disk information.


Wipe out all the data
Choose this option if you want to destroy completely all the data on the selected object.
Clear (wipe) free space
Choose this option if you want to destroy the traces of data that may have been left after an ordinary delete operation.

5. On the Wipe Method page select a specific data erasure algorithm or choose to create a customized one (in our case we prefer to use a certified military standard).


SSD Trim (recommended)
Hardware based, fast wipe method
Specific algorithm
US DoD 5220.22-M
You can see the algorithm description and set the level of verification on the next page.
Create your own Data Sanitization method
You can create your own Data Sanitization method.

The list of supported military and government standards may vary for your product.

6. The next page of the wizard enables to get detailed information on the selected algorithm, choose whether to carry out residual data verification or not specifying the percentage of sectors to check and estimate the time required to accomplish the operation.

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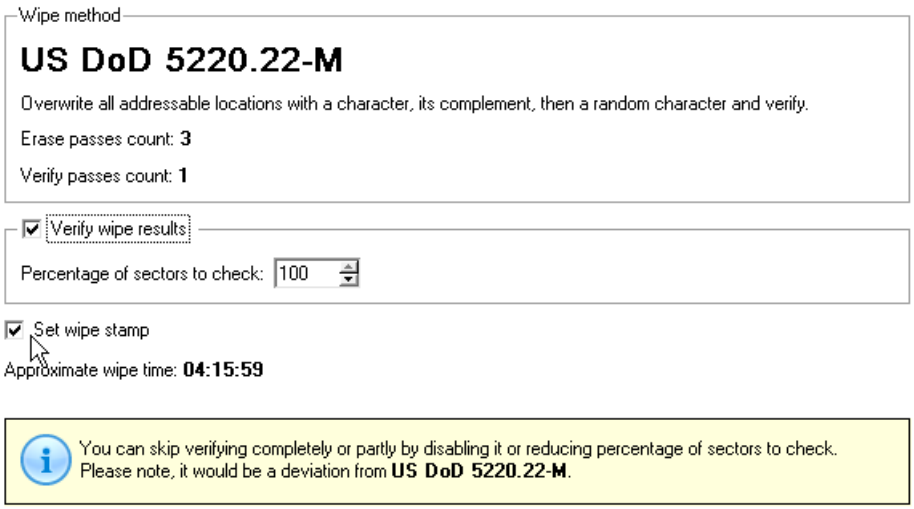
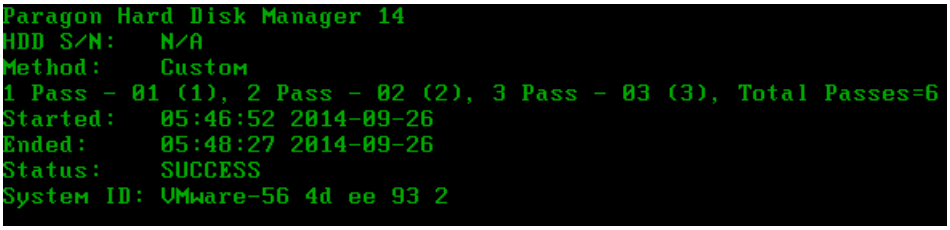
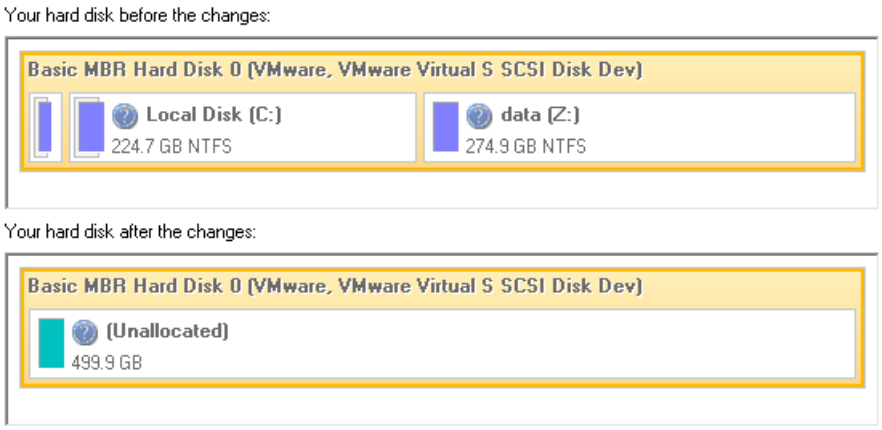

Wipe method
US DoD 5220.22-M
Overwrite all addressable locations with a character, its complement, then a random character and verify.
Erase passes count: 3
Verify passes count: 1
Verify wipe results
Percentage of sectors to check: 100
Set wipe stamp
Approximate wipe time: 04:15:59
You can skip verifying completely or partly by disabling it or reducing percentage of sectors to check.
Please note, it would be a deviation from US DoD 5220.22-M.

By marking the **Set wipe stamp** checkbox you make the wizard add to the MBR of the wiped storage device information on the used wipe program, algorithm, device serial number, wipe status, system ID (obtained through WMI), etc. Thus when attempting to boot from this storage, you'll be notified how and when this storage has been wiped. Please note this option is only available for wiping of entire disks.


Paragon Hard Disk Manager 14
HDD S/N: N/A
Method: Custom
1 Pass - 01 (1), 2 Pass - 02 (2), 3 Pass - 03 (3), Total Passes=6
Started: 05:46:52 2014-09-26
Ended: 05:48:27 2014-09-26
Status: SUCCESS
System ID: VMware-56 4d ee 93 2

7. Review all parameters of the operation and modify them if necessary.


Your hard disk before the changes:
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (C:)
224.7 GB NTFS
data (Z:)
274.9 GB NTFS
Your hard disk after the changes:
Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
(Unallocated)
499.9 GB

8. Complete the wizard and then apply the pending changes.

Extra Scenarios for WinPE

Please use Recovery Media Builder to prepare Paragon's recovery environments on CD/DVD, flash, or in an ISO-image.

Adding specific drivers

The WinPE based recovery environment offers excellent hardware support. Anyway you've got the option to add drivers for specific hardware with a handy dialog.

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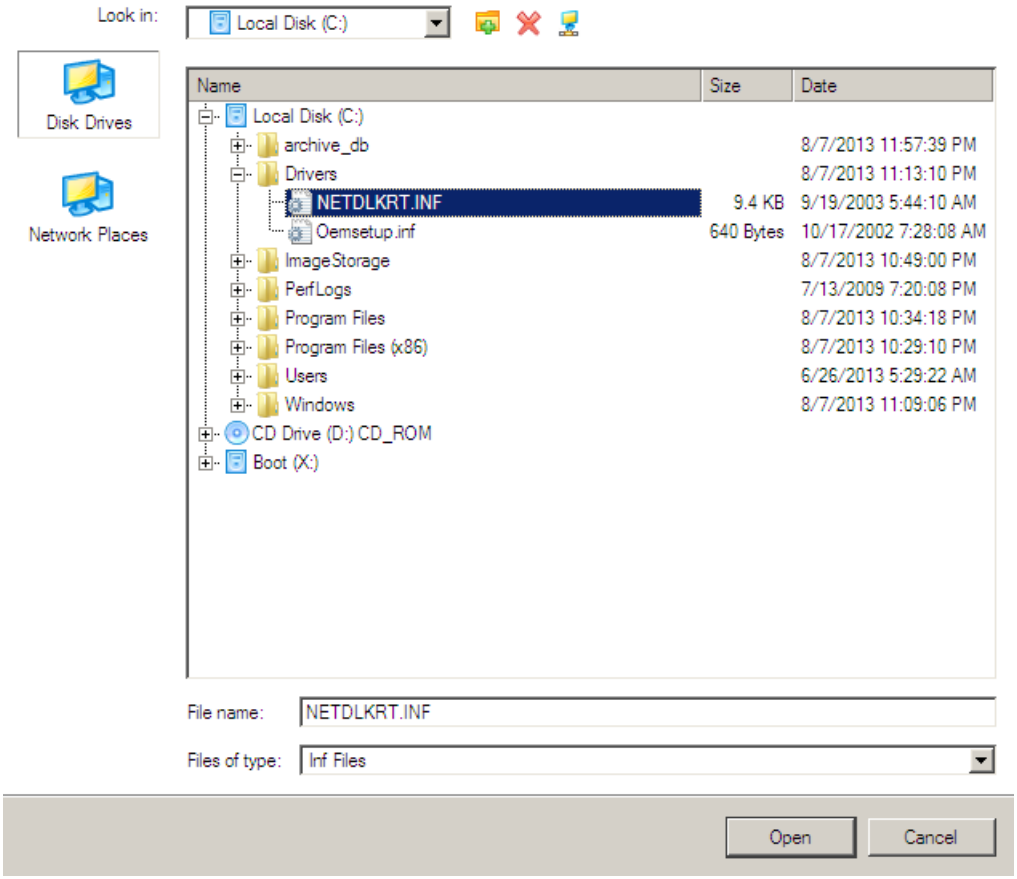
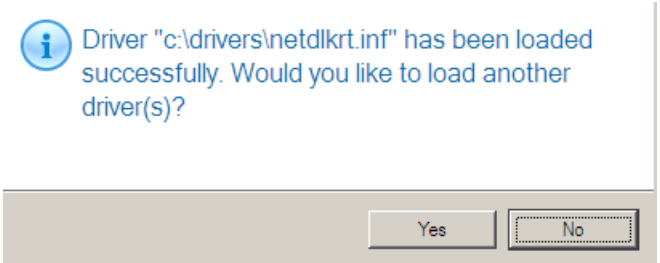
To add drivers for specific hardware, please do the following:

1. Click **Load Drivers**.
2. In the opened dialog browse for an .INF file of the required driver package located on a floppy disk, local disk, CD/DVD or a network share. Then click the **Open** button to initiate the operation



To know how to map a network share, please consult the Configuring network scenario.

3. You will be notified on the successful accomplishment of the operation. Click **Yes** to load another driver or **No** to close the dialog.



The WinPE recovery environment can either be 32- or 64-bit, so are to be drivers for injection.

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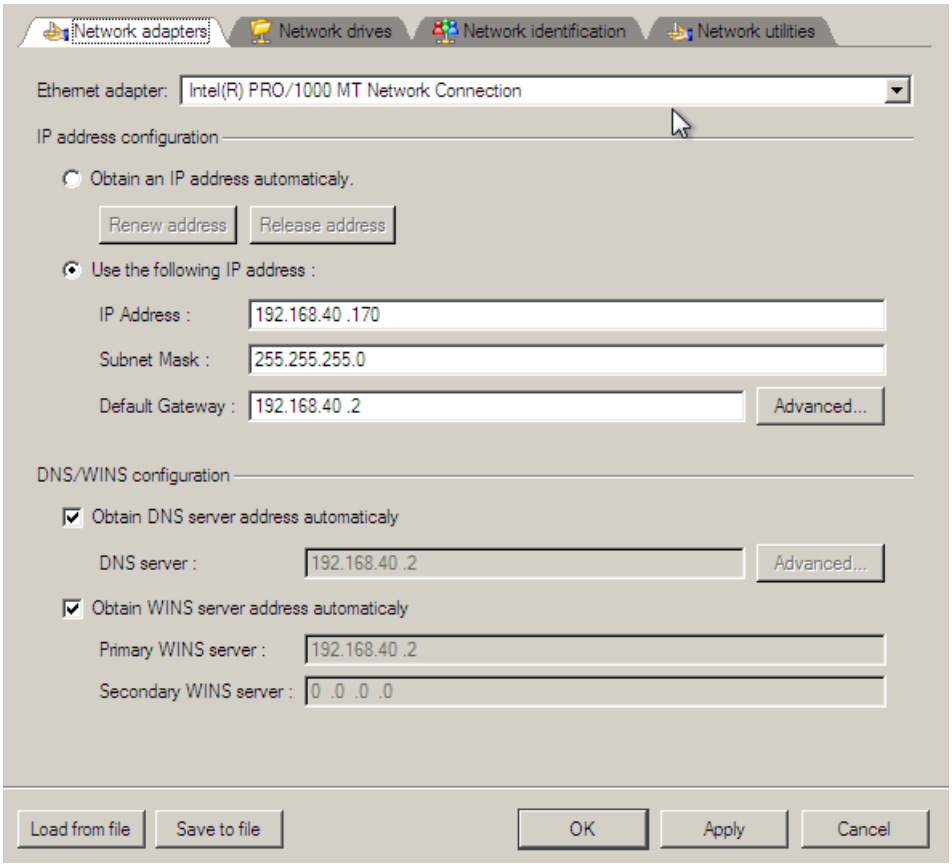
Configuring network

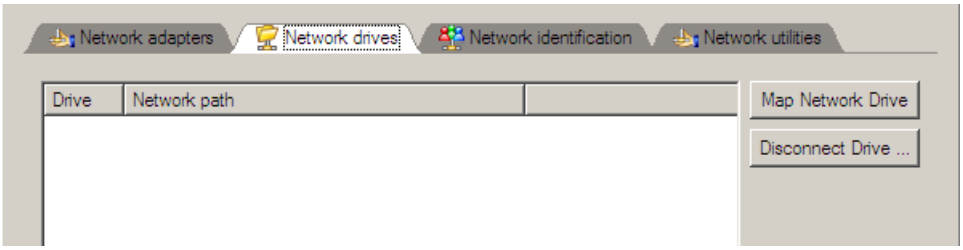
If your local network has a DHCP server, a network connection will be automatically configured once the WinPE recovery environment has been started up. Otherwise you will need to do it manually with a handy dialog by providing an IP address, a network mask, default gateway, etc. Besides with its help you can easily map network shares.

To manually set up a network connection and map a network share, please do the following:

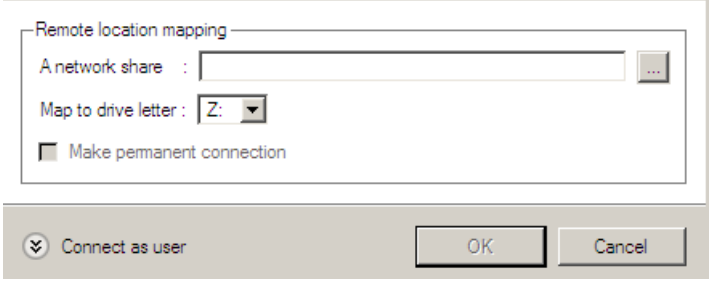
1. Click **Configure Network**.
2. In the opened dialog provide an IP address, a network mask, default gateway, etc. for your network device.



3. Click the **Network drivers** tab to map a network share.



4. Click **Map Network Drive** and provide all the necessary information to map a network share in the opened dialog:



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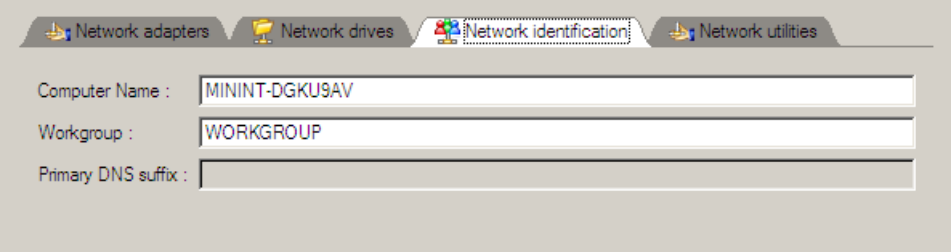
- Click the standard browse button [...] to browse for the required network share or manually enter a path to it;
- Define a letter from the pull-down list of available drive letters;
- Click the **Connect as user** button at the foot of the dialog page to specify a user name and password to access the selected network share if necessary.

By clicking **Disconnect Drive…** you can delete an existing network share if necessary.

5. Click the **Network identification** tab to change a network name of your computer (generated automatically) and a workgroup name.

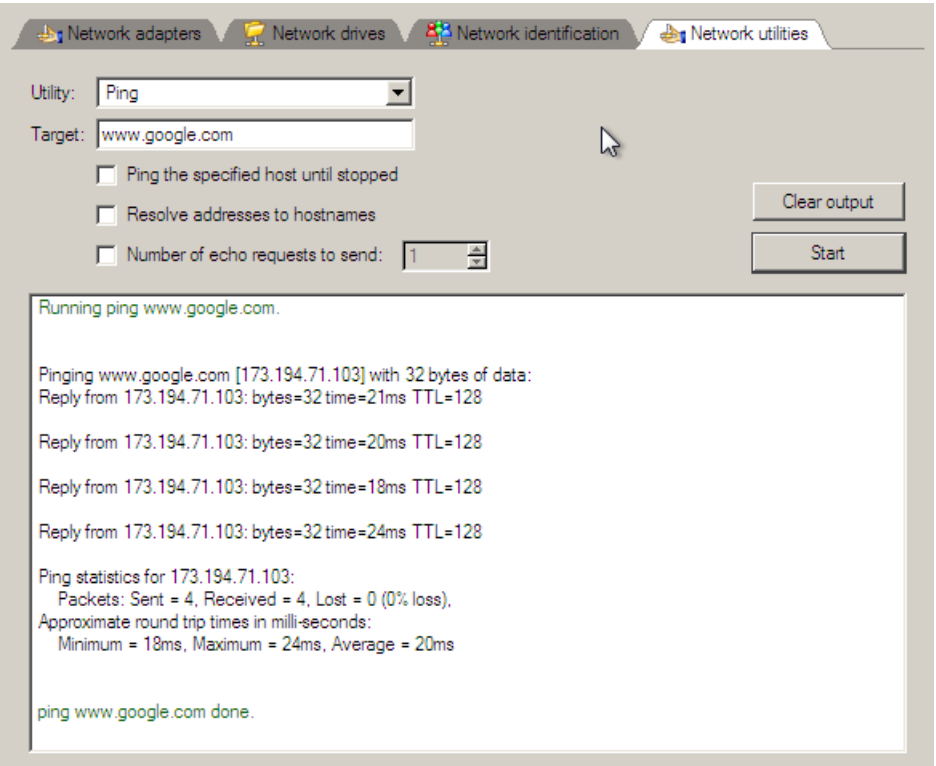


6. By default, the wizard saves all network settings in the netconf.ini file located on the WinPE RAM drive, thus it will only be available until you restart the computer. However, you can just once configure your network device and then save this file to some other destination, for instance a local drive, and this way avoid constant re-configuration, just by providing a path to it. So Click **Save to file** to save the netconfig.ini file to the required destination.

Network troubleshooter

Network Configurator includes a traceroute/ping utility that enables to get detailed information on particular routes and measure transit delays of packets across an Internet Protocol (IP) network. So with its help you can easily track down problematic nodes.

1. If you need to ping some network host, please select **Ping**, then type in the required IP address or its name. Click **Start** when ready.


Network adapters
Network drives
Network identification
Network utilities
Utility:
Ping
Target:
www.google.com
Ping the specified host until stopped
Resolve addresses to hostnames
Number of echo requests to send:
1
Clear output
Start
Running ping www.google.com.
Pinging www.google.com [173.194.71.103] with 32 bytes of data:
Reply from 173.194.71.103: bytes=32 time=21ms TTL=128
Reply from 173.194.71.103: bytes=32 time=20ms TTL=128
Reply from 173.194.71.103: bytes=32 time=18ms TTL=128
Reply from 173.194.71.103: bytes=32 time=24ms TTL=128
Ping statistics for 173.194.71.103:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 18ms, Maximum = 24ms, Average = 20ms
ping www.google.com done.

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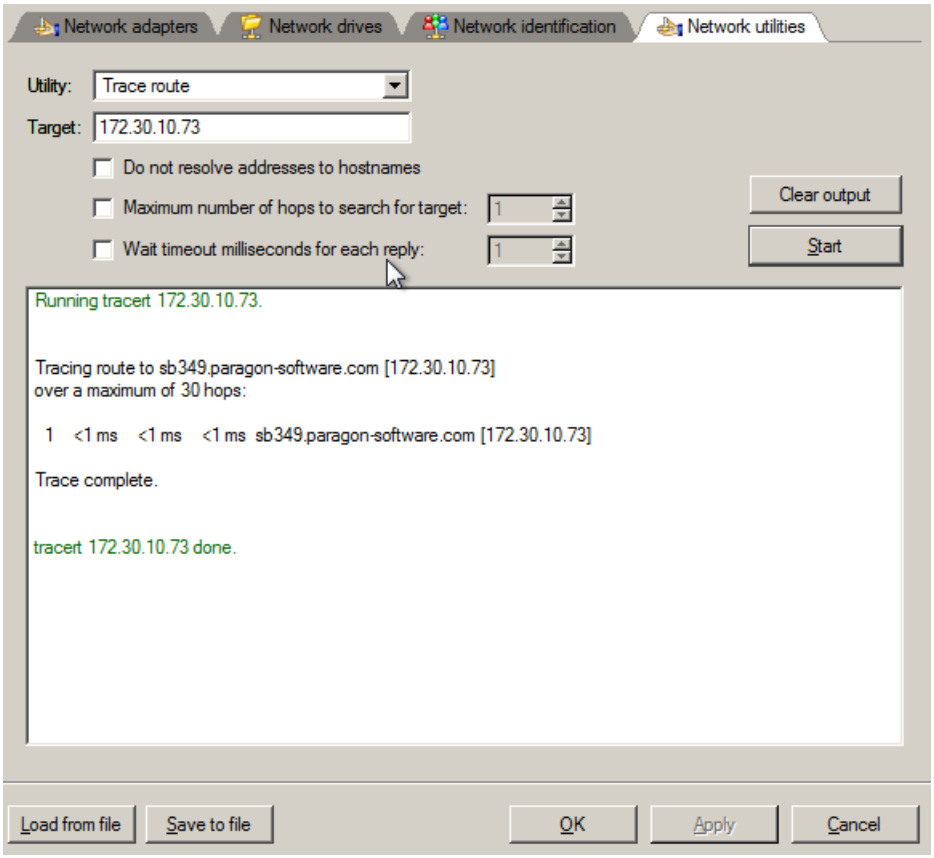
- **Ping the specified host until stopped**. Mark the option to ping the chosen host for indefinite time;
- **Resolve addresses to hostnames**. Mark the option to display hostnames instead of IP addresses.
- **Number of echo requests to send**. By default the utility sends 4 echo requests, which you can modify however.

2. If you need to trace a route to some network host, please select **Trace route**, then type in the required IP address or its name. Click **Start** when ready.



- **Do not resolve addresses to hostnames**. Mark the option to display IP addresses instead of hostnames.
- **Maximum number of hops to search for target**. By default the utility goes through maximum 30 hops when searching for the target host, which you can modify however.
- **Wait timeout milliseconds for each reply.** By default the utility waits 4 seconds for each echo reply message. If not received within the timeout, an asterisk (*) is displayed.

Saving log files

The program enables to simplify the procedure of sending support requests to the Paragon Support Team. In case of having difficulties with handling the program, you, with the help of this very function, can address the company support engineers and provide them with all the information they need such as the disk layout, performed operations, etc. in order to tackle the encountered problem. Information of that kind is stored in log files.

To prepare a log files package, please do the following:

1. Click **Log Saver**.
2. Provide an e-mail address used for registering the product, then give a detailed description on the encountered problem in the corresponding text fields. Please don't worry - we respect your privacy, so none of your confidential data will be exposed. This utility only collects the program's operation logs to help our Support Team find and tackle your problem. Click **Next** to continue.

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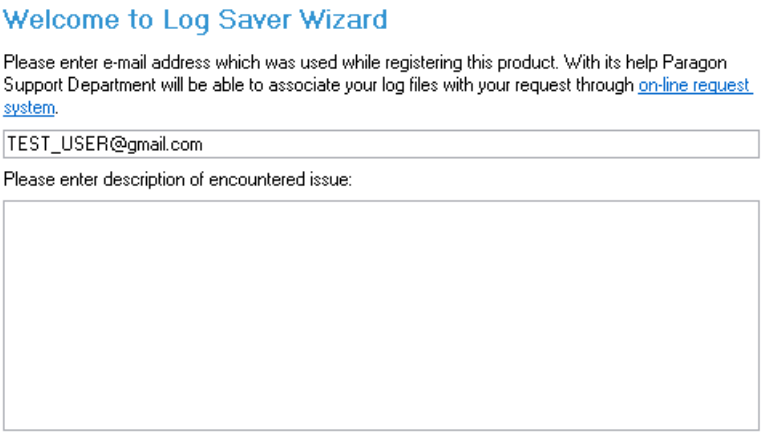
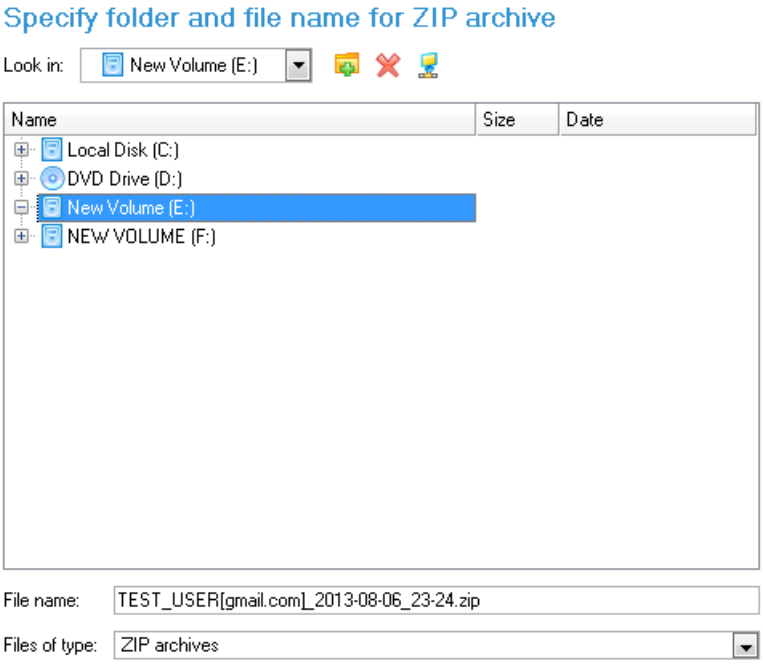

Welcome to Log Saver Wizard
Please enter e-mail address which was used while registering this product. With its help Paragon Support Department will be able to associate your log files with your request through on-line request system.
TEST_USER@gmail.com
Please enter description of encountered issue:

Log files do not contain any confidential information on the operating system settings or the user documents.

3. Browse for the required location of the log files package or manually provide a full path to it. Click **Save** to initiate the operation.



This function is also available under Windows.

How to Work with Bitlocked Volumes

Our product allows you to accomplish a number of operations on volumes encrypted by Windows BitLocker, but only when they are unlocked. Until that locked volumes will be recognized in the program's interface as 'Not formatted'. You can unlock this type of volumes only through Windows-native facilities:

- Graphical user interface for Windows,
- **manage-bde** command line tool for Windows and the WinPE recovery media.

Let's see how to unlock a volume encrypted by BitLocker in Windows and the WinPE recovery media.

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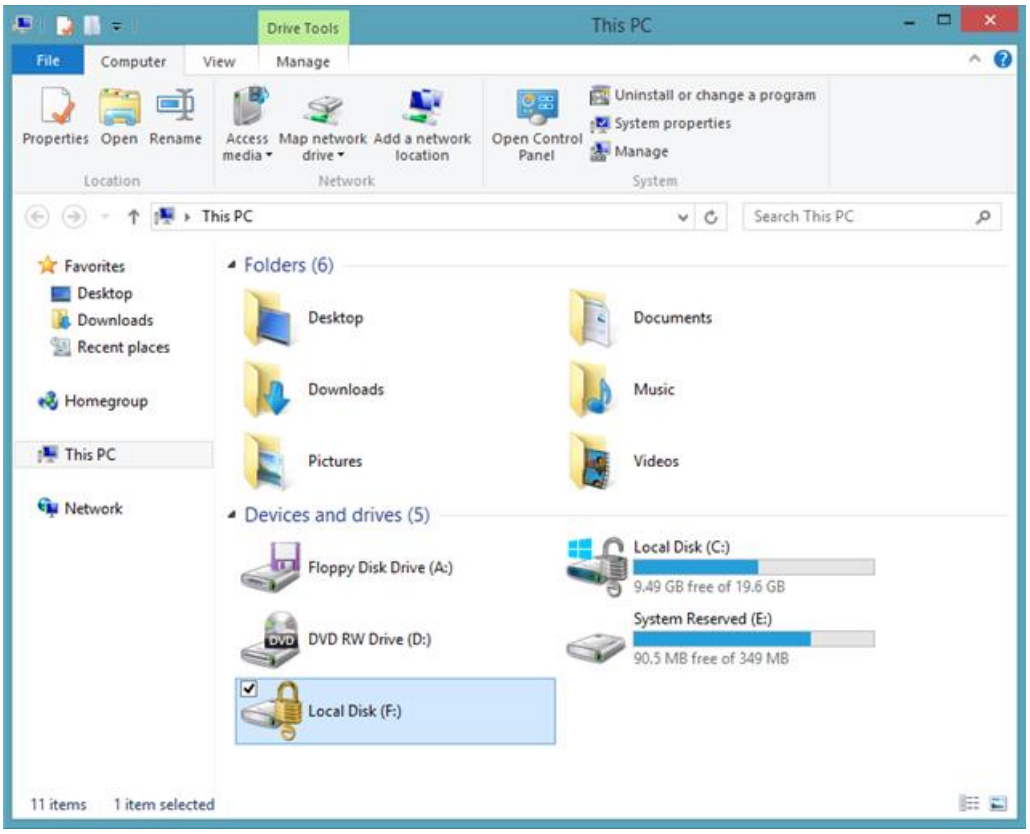
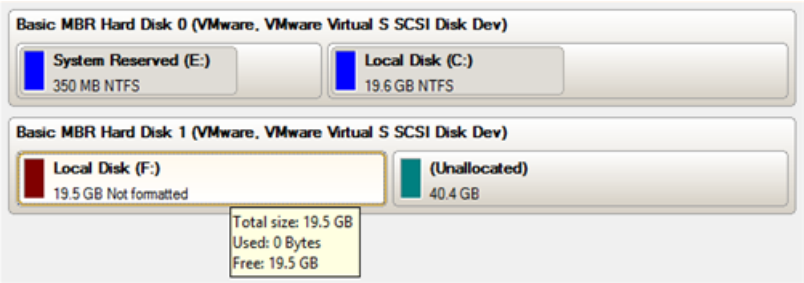
In Windows

1. Initially we've got a bitlocked data volume **F:**, displayed as a volume under lock in Windows Explorer.



If going to the main launcher of our program right now (**Open Advanced Interface**), this very volume will be detected as 'Not formatted', thus no backup, restore, or copy operation will be available for it.


Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
System Reserved (E:)
350 MB NTFS
Local Disk (C:)
19.6 GB NTFS
Basic MBR Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (F:)
19.5 GB Not formatted
(Unallocated)
40.4 GB
Total size: 19.5 GB
Used: 0 Bytes
Free: 19.5 GB

2. To unlock it, please right click of the mouse on the corresponding volume in Windows Explorer, then select **Unlock Volume…** or use the corresponding option of the main launcher (**Partition > Unlock Volume**).

There are other ways to unlock a volume encrypted by BitLocker. For more information, please consult documentation provided by Microsoft.

3. Enter an unlock password.

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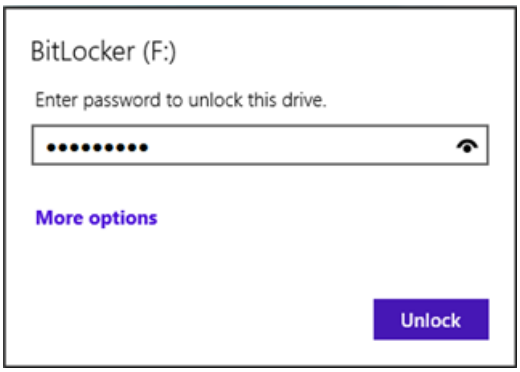
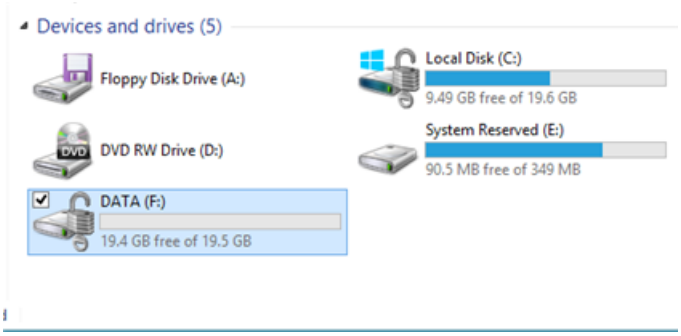
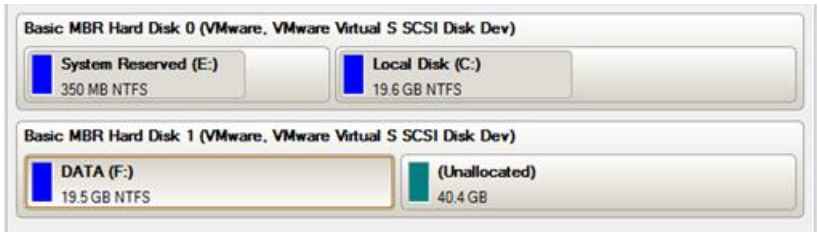


4. As a result, the volume should be unlocked.


Devices and drives (5)
Floppy Disk Drive (A:)
Local Disk (C:)
9.49 GB free of 19.6 GB
DVD RW Drive (D:)
System Reserved (E:)
90.5 MB free of 349 MB
DATA (F:)
19.4 GB free of 19.5 GB

If going to the main launcher of our program right now (**Open Advanced Interface**), the volume will be correctly detected and become available for operation.


Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
System Reserved (E:)
350 MB NTFS
Local Disk (C:)
19.6 GB NTFS
Basic MBR Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
DATA (F:)
19.5 GB NTFS
(Unallocated)
40.4 GB

The same action can also be accomplished through the 'manage-bde' command line tool. For more information, please consult the next scenario.

In WinPE

1. Start up the computer from the WinPE recovery media.

To automatically boot from the recovery media please make sure the on-board BIOS is set up to boot from CD/USB first.

2. Go to the **Security and BitLocker Encryption** section, then select **List of Volumes**.
3. Define volumes encrypted by BitLocker (will be detected as 'Unknown'). If having several bitlocked volumes (just our case), you can pinpoint the required volume by its size.

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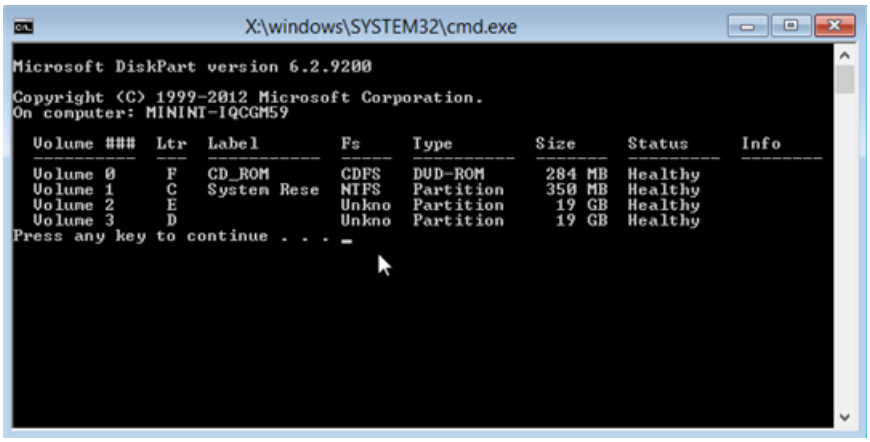
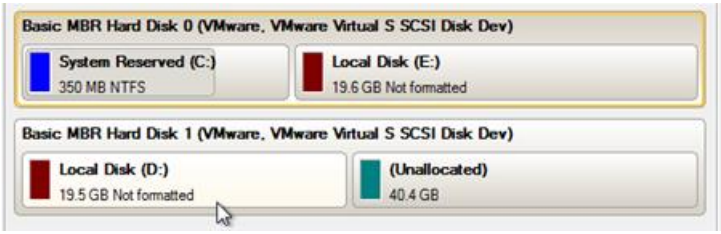
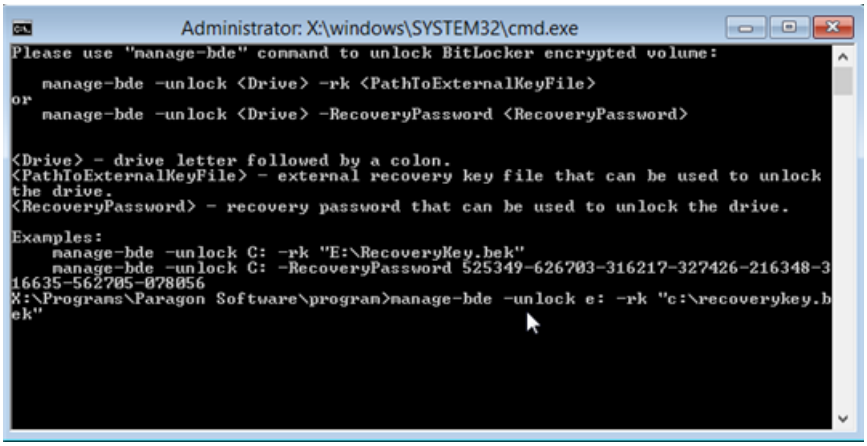

X:\windows\SYSTEM32\cmd.exe
Microsoft DiskPart version 6.2.9200
Copyright (C) 1999-2012 Microsoft Corporation.
On computer: MININT-IQCGM59
Volume ### Ltr Label Fs Type Size Status Info
Volume 0 F CD_ROM CDFS DVD-ROM 284 MB Healthy
Volume 1 C System Rese NTFS Partition 350 MB Healthy
Volume 2 E Unkno Partition 19 GB Healthy
Volume 3 D Unkno Partition 19 GB Healthy
Press any key to continue . . .

If going to the main launcher of our program right now (**Open Advanced Interface**), you can see all unknown volumes detected as 'Not formatted', just like it was under Windows.


Basic MBR Hard Disk 0 (VMware, VMware Virtual S SCSI Disk Dev)
System Reserved (C:)
350 MB NTFS
Local Disk (E:)
19.6 GB Not formatted
Basic MBR Hard Disk 1 (VMware, VMware Virtual S SCSI Disk Dev)
Local Disk (D:)
19.5 GB Not formatted
(Unallocated)
40.4 GB

Drive letters in Windows and WinPE may differ, so please do not use them as identifiers.

4. Close the dialog, then select **Unlock Encrypted Volumes**.
5. Use provided examples and grammar to unlock the required volume. If you'd like to see all commands of the **manage-bde** tool, please run it with the '–help' parameter (**manage-bde -help**).


Administrator: X:\windows\SYSTEM32\cmd.exe
Please use "manage-bde" command to unlock BitLocker encrypted volume:
manage-bde -unlock <Drive> -rk <PathToExternalKeyFile>
or
manage-bde -unlock <Drive> -RecoveryPassword <RecoveryPassword>
<Drive> - drive letter followed by a colon.
<PathToExternalKeyFile> - external recovery key file that can be used to unlock the drive.
<RecoveryPassword> - recovery password that can be used to unlock the drive.
Examples:
manage-bde -unlock C: -rk "E:\RecoveryKey.bek"
manage-bde -unlock C: -RecoveryPassword 525349-626703-316217-327426-216348-316635-562705-078056
X:\Programs\Paragon Software\program>manage-bde -unlock e: -rk "c:\recoverykey.bek"

As you can see on the screenshot above, we're attempting to unlock volume **E:** by providing a path to the corresponding recovery key (**recoverykey.bek**), which is placed on System Reserved (volume **C:**).

The same dialog can also be called from the main launcher (right click of the mouse on the required volume, then select 'Unlock Volume').

6. As a result, the volume should be unlocked.

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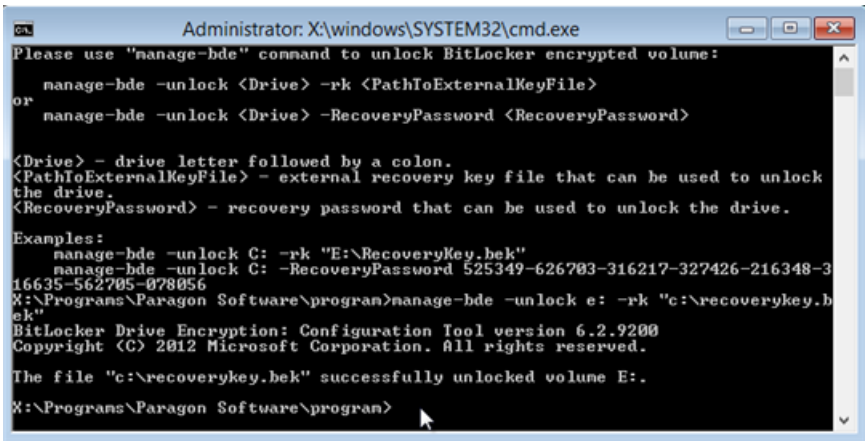
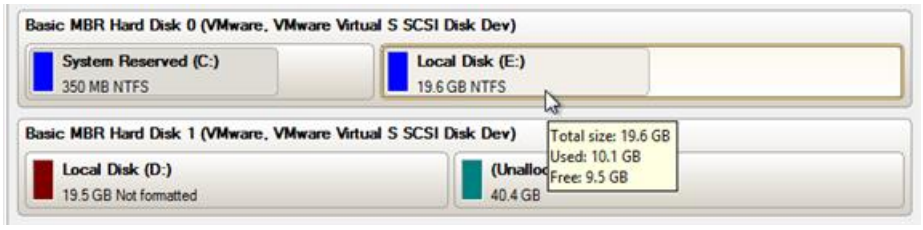


If going to the main launcher of our program now (**Open Advanced Interface**), the volume will be correctly detected and become available for operation.



Troubleshooter

Here you can find answers to the most frequently asked questions that might arise while using the program.

1. I try to run an operation, but the program claims my partition is in use and suggests restarting the computer.

   There are a number of operations that cannot be performed while your partition is in use (or locked in other words). Please agree to reboot your machine to make the program accomplish the operation in a special boot-up mode.

2. I run an operation and restart the machine as required, but it just boots back into Windows without accomplishing the operation.

   Please run 'chkdsk /f' for the partition in question.

3. I cannot create a new partition on the disk.

   There can be a number of reasons for that:

   - The program cannot create a new partition on a dynamic disk.
   - The program allows creating new partitions only within blocks of un-partitioned space. It cannot convert a free space on an existing partition to a new partition.

4. I cannot copy a partition.

   There can be a number of reasons for that:

   - The source or target disk you select is a dynamic disk;

   - 4 primary partitions (or three primary partitions and an extended one) already exist on the target disk.

5. I need to copy a partition. But when selecting a place where to make a copy, I always get a crossed circle sign no matter which partition is selected.

   The program enables to copy a partition only to a block of un-partitioned space. If you don’t have a block of free space on your hard disk, please delete or reduce an existing partition to accomplish the operation.

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6. I cannot do anything with my USB flash drive. I get a crossed circle sign when trying to select any area on it.

   Some USB flash drives don't have the MBR (Master Boot Record), that's the cause of your problem. To fix the issue please use the Update MBR function of our program or 'fixmbr' of the Windows installation disc to write a standard code to your flash drive.

7. When trying to back up my system the program asks to restart the computer.

   Most likely the Hot Processing mode is disabled. Please make it active in the program settings.

8. When backing up a partition with the VSS (Volume Shadow Copy Service) mode, the program throws "VSS could not be started for processed volume".

   Most likely you try to back up a FAT32 partition, which is not supported by VSS. Please use the Paragon Hot Processing mode instead.

9. I cannot back up my hard disk to an external hard drive. Once started, the operation is aborted with the following error: Hard Disk management, Error Code 0x1100a. What is wrong here?

   The problem is that the Microsoft VSS service is set as the default Hot Processing mode in the program. But this service has not been started in your WindowsXP/Windows2003/Vista. Please start this service (right click on My Computer > Manage > Services > find Microsoft Volume Shadow Copy Service and make it active. Set also to start it automatically).

10. When running a backup operation with the Paragon Hot Processing mode enabled, I get an error: error code 0x1200e "Internal error during Hot Backup"

    Most likely your hard disk contains bad blocks. Please fix the issue with your HDD manufacturer's tool.

    You can find a name of the tool you need here: http://kb.paragon-software.com

11. When running a backup operation with the Microsoft VSS mode enabled, I get the following error: error code 0x12016 "VSS: can't read volume data"

    Most likely your hard disk contains bad blocks. Please fix the issue with your HDD manufacturer's tool.

    You can find a name of the tool you need here: http://kb.paragon-software.com

12. When trying to back up to a network share, I get the following error: "i/o error" or "can't open/create file"

    Please check whether you've got a permission to write to the selected destination or not.

13. When trying to restore a backup archive, I get the following error: "Can't restore to current selection" or "Archive does not fit"

    Most likely you're trying to restore a backup of the whole hard disk to a partition or vice versa.

14. I set up a timetable for a task, but it fails to execute.

    There can be a number of reasons for that:

    - Windows Task Scheduler does not work properly. Check whether it is so or not by scheduling a simple task (call Notepad through scheduling);

    - You don't have permission to write to the selected backup destination.

Glossary

Active Partition is a partition from which an x86-based computer starts up. The active partition must be a primary partition on a basic disk. If you use Windows exclusively, the active partition can be the same as the system volume.

In the DOS partitioning scheme, only primary partitions can be active due to limitations of the standard bootstrap.

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The term **backup** originates from the time when the best way to protect valuable information was to store it in form of archives on external media. It's become now a general notion to mean making duplications of data for protection purposes.

Bootable Archive is created by adding a special bootable section when backing up the data to CD/DVDs. Thus you will be able to restore the data from these archives without having to run the program, but by simply booting from these CD/DVDs.

Cluster is the smallest amount of disk space that can be allocated to hold a file. All file systems used by Windows organize hard disks based on clusters, which consist of one or more contiguous sectors. The smaller the cluster size, the more efficiently a disk stores information. If no cluster size is specified during formatting, Windows picks defaults based on the size of the volume. These defaults are selected to reduce the amount of space that is lost and the amount of fragmentation on the volume. A cluster is also called an allocation unit.

Extended Partition is a partition type you create only on a basic MBR (Master Boot Record) disk. Extended partition is used if you want to create more than four volumes on a disk, since it may contain multiple logical drives.

File System Metadata. The servicing structures of a file system, which contain information about allocating files and directories, security information etc, are named the file system metadata. It is invisible for users and regular applications because its accidental modification usually makes a partition unusable.

Hard Disk Geometry. Traditionally, the usable space of a hard disk is logically divided into cylinders, cylinders are divided into tracks (or heads), and tracks are divided into sectors.

The triad of values {[Sectors-per-Track], [Tracks-per-Cylinder], [Amount-of-Cylinders]} is usually named the Hard Disk Geometry or C/H/S geometry.

Tracks and cylinders are enumerated from "0", while sectors are enumerated from "1". These disk parameters play an essential role in the DOS Partitioning scheme.

Modern hardware uses an advanced scheme for the linear addressing of sectors, which assumes that all on-disk sectors are continuously enumerated from "0". To allow backward compatibility with older standards, modern hard disks can additionally emulate the C/H/S geometry.

Hidden Partition. The concept of a "hidden" partition was introduced in the IBM OS/2 Boot Manager. By default, an operating system does not mount a hidden partition, thus preventing access to its contents.

A method of hiding a partition consists in changing the partition ID value saved in the Partition Table. This is achieved by XOR-ing the partition ID with a 0x10 hexadecimal value.

Master File Table (MFT) is a relational database that consists of rows of file records and columns of file attributes. It contains at least one entry for every file on an NTFS volume, including the MFT itself. MFT is similar to a FAT table in a FAT file system.

MBR & 1st track of the hard disk is the 0th sector of the disk. MBR (Master Boot Record) contains important information about the disk layout:

- The used partitioning scheme;

- The starting records of the Partition Table;

- The standard bootstrap code (or the initial code of boot managers, disk overlay software or boot viruses).

Generally, the 0th sector is used for similar purposes in all existing partitioning schemes.

The MBR capacity is not sufficient to contain sophisticated boot programs. That's why the on-boot software is allowed to use the entire 0th track of the disk. For example, boot managing utilities such as LILO, GRUB and Paragon Boot Manager are located in the 0th track.

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Partition ID (or File system ID) is a file system identifier that is placed in the partition. It is used to quickly detect partitions of supported types. A number of operating systems completely rely on it to distinguish supported partitions.

Partition ID is saved in appropriate entries of the Partition Table and takes only 1 byte of space.

Partition Label (or Volume Label) is a small textual field (up to 11 characters) that is located in the partition's boot sector. This value is used for notification purposes only. It is detectable by any partitioning tool including the DOS FDISK utility.

Modern operating systems save it within a file system, e.g. as a special hidden file. Thus it is able to contain a relatively large amount of text in multiple languages.

Partitioning Scheme is a set of rules, constraints and format of the on-disk structures to keep information on partitions located on a hard disk.

There are known several partitioning schemes. The most popular of them is the so-called DOS partitioning scheme. It was introduced by IBM and Microsoft to use multiple partitions in the disk subsystems on IBM PC compatible computers.

Another popular partitioning scheme is the so-called Logical Disks Model (LDM) that originates from the UNIX mainframe systems. Veritas Executive accommodates a simplified version of LDM to the Windows 2000 operating system.

Windows 2000 and XP support two quite different partitioning schemes: the old DOS partitioning scheme and the new Dynamic Disk Management (DDM). The problem is that earlier versions of Windows do not support DDM. In addition, most hard disk utilities do not support it as well.

Recovery Media is a CD/DVD disc, a USB flash card or even a floppy disk from which you can boot for maintenance or recovery purposes.

Root Directory is the top-level directory of a formatted logical drive to include other files and directories. In modern file systems (Ext2/Ext3, NTFS and even FAT32) it does not differ from other directories. This is not the case for old FAT12 and FAT16 file systems.

Serial Number. In the DOS partitioning scheme, every hard disk and every partition has a 32-bit serial number represented by an 8-figure hexadecimal value. It is stored in the MBR and its value is assigned when the MBR sector is initialized by Microsoft standard disk managing tools, such as Windows Disk Administrator and the FDISK utility.

In fact, a hard disk's serial number is not important for most operating systems and software. It is known that Windows NT, 2000 and XP store its value in the database of assigned drive letters.

A partition's serial number is stored in its boot sector (in FAT16, FAT32 and NFTS file systems). Its value is assigned when the partition is formatted. It does not play an important role for most operating systems and software as well.

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